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TITLE: Family Maltreatment, Substance Problems, and Suicidality: Prevalence  
Surveillance and Ecological Risk/Protective Factor Models

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## INTRODUCTION

One-quarter of airmen experience family maltreatment, suicidality, and/or problematic alcohol/drug use at a serious level (i.e., at a level that, incontrovertibly, the AF would intervene therapeutically, administratively, or legally), degrading the AF's ability to fly, fight, and win our nation's wars. However, only 1 out of 6 reaches out to anyone in uniform (friend, first sergeant, commander, service agency). This study intended to enhance the ability of base, MAJCOM, and Air Staff IDSs to reduce death, injury, and degraded force readiness from family maltreatment, suicidality, and problematic alcohol and drug use by (a) developing and validating the accuracy of an innovative surveillance system (AF-wide) for these "secretive" problems and (b) testing a series of hypotheses regarding risk and protective factors for secretive problems in AF communities. Utilizing data gathered from 52,780 airmen as part of the 2006 AF Community Assessment (CA) survey, we developed algorithms for accurately estimating the prevalences of secretive problems, obviating the need for direct assessment of secretive problems in the future. For each problem, we then developed (a) simple and additive risk and promotive effect models at various ecological levels of influence, (b) interactive (e.g., protective) effect models within and across ecological levels, and (c) comprehensive structural equation models of risk, including distal and proximal effects.

## BODY

### Method

#### Procedure

The current study used archival data. Active-duty members of the United States Air Force (AF;  $N = 128,950$ ) were invited to complete the 2006 Community Assessment (CA). The 2006 CA was administered at approximately the same time as another large survey of AF active-duty members. To minimize sample overlap and the concomitant potential for response rate reductions in both surveys due to survey fatigue, sampling was conducted simultaneously. Linear programming was used to determine whether each active-duty member in the AF would be invited to complete the CA, the other survey, or neither. Active-duty members were sampled from each AF installation via stratified random sampling, with strata defined within each base population by pay grade, AF Specialty Code job category, gender, race, and religious faith. Unless a given stratum was so small that all members of the stratum had to be sampled (e.g., a stratum consisting of one person), the number drawn from within each stratum was proportional to that stratum's size at the installation in question. Due to a tremendous size difference between the largest and smallest AF bases, the number sampled from each installation was not proportional to the installation's contribution to the total AF population; rather, the smallest bases were oversampled so as to allow sufficient power for base-level analysis.

The CA was administered online by a civilian contractor from April 27th to June 23rd, 2006, and assessed individual, family, workplace, and community functioning, as well as sensitive behavioral health problems including suicidal ideation. Each selected participant was emailed an invitation containing the Web link to the survey, as well as an access code. The different access codes conveyed coded information to the survey team regarding some of the sampling strata (i.e., job category, race, and religious affiliation). Access codes were not linked with individual participants. From launch date to survey close, weekly emails were sent reminding the selected active-duty members to participate; each base also conducted its own community-wide campaign encouraging participation from anyone who had been invited to do

so. The survey took approximately 45 minutes to one hour to complete and could be filled out across multiple sessions if necessary.

## Measures

The CA is a survey of community capacity that includes potential risk and protective factors for secretive problems — i.e., demographic questions, quantitative items (e.g., typical number of hours worked each week), and brief scales measuring a large variety of individual, family, workplace, and community constructs. Although based on existing literature and relying on items from standardized measures when feasible, the CA was designed by a working group with the help of outside consultants. Due to the number of constructs being assessed and the desired number of participants, the development group deemed it necessary to minimize the length of the survey, particularly given that no form of compensation was being offered for participating. Therefore, each construct was measured with the minimum number of items deemed necessary by the CA developers. A few established scales were utilized in their entirety; more often, as few items as possible were drawn and/or adapted from an established scale. Other items and scales were created specifically for the CA. The scales utilized in the current study are described below. Detailed psychometrics on the CA versions of the scales have been reported previously (see Snarr, Heyman, & Slep, 2006); factor analyses confirmed the expected factor structure of each altered scale, and all internal consistency coefficients remained adequate (mean = .83, range = .63 – .95).

### *Risk and Protective Factors*

At the individual level, the Community Assessment assessed depressive symptoms (seven items), financial stress (five items), personal coping (nine items), physical well being (six items), years in the military, and religious involvement (five items). Family-level constructs included number of children, family income (estimated from active-duty member pay grade, family composition and, if relevant, spouse employment), partner support for the participant's AF career (three items), relationship satisfaction (four items), family coping (three items), spouse preparedness for deployment (two items), and parent-child relationship satisfaction (three items). Work-related variables included hours worked per week, weeks deployed in past year, satisfaction with the way of life associated with the AF (five items), support from leadership (17 items), work group cohesion (six items), and workplace relationship satisfaction (three items). Finally, at the community level, the survey assessed community safety (six items), community resources (13 items), community unity (21 items), community support for youth (three items), support from formal agencies (six items), support from neighbors (seven items), and general social support (five items).

### *Secretive Problems*

Throughout this report, we label three threats to force health — family maltreatment, suicidality, and substance abuse — as “secretive problems.” This is not at all to imply that their existence in the AF is a secret. Rather, AD members who have them try to keep them secret from the community, which typically learns that a member has a problem only after a serious incident (e.g., a DUI, a suicide attempt, a child's hospitalization due to abuse).

**Alcohol Problems.** The 10-item Alcohol Use Disorders Identification Test (AUDIT) has excellent, well-established test-retest reliability and criterion validity as a screen for alcohol dependence and for less severe alcohol problems. It can be analyzed as a total sum of all items (range: 0-40) or as two separate factors — alcohol consumption (three items; range: 0-12) and

problematic alcohol-related consequences (seven items; range: 0-28).

**Drug Use.** The drug use measure was divided into two sections: prescription drug misuse and illicit drug use. Each section provided participants with an alphabetical checklist of drugs of that type (e.g., amphetamines, barbiturates, codeine; cocaine, hashish, heroin). For each prescription medication checked, the respondent was asked (a) the frequency of use when s/he did not have a prescription and (b) the frequency of use at a dosage greater than prescribed. For each illicit drug checked, the respondent was asked about the frequency of use.

**Suicidality.** Suicidality was assessed with five items developed by the Centers for Disease Control and used in nationally representative studies:

1. During the past 12 months, how often did you have thoughts of ending your life? (Never, Rarely, Sometimes, Frequently)<sup>1</sup>
2. During the past 12 months, did you ever seriously consider attempting suicide? (Never, Rarely, Sometimes, Frequently)
3. During the past 12 months, did you make a plan about how you would attempt suicide? (Yes, No)
4. During the past 12 months, how many times did you actually attempt suicide? (Never, 1 time, 2 or 3 times, 4 or 5 times, 6 or more times)
5. [If applicable] Did any of your suicide attempts result in an injury, poisoning, or overdose that had to be treated by a doctor or nurse? (Yes, No)

Individuals were classified as having problematic levels of suicidal ideation if they responded (a) “sometimes” or “frequently” on item 1 or (b) “rarely” or greater on item 2. Item 4 was dichotomized (0 vs. 1 or more) to form the measure of suicide attempts.

**Partner Physical Assault and Abuse.** An inventory of the frequency of aggressive acts perpetrated and experienced in the previous year was administered. Respondents could also indicate “other” and write in other acts which were coded by the authors as partner physical assault or not. Total frequency of all acts endorsed constituted the partner physical assault measure. Follow-up questions asked about injuries and fear resulting from each act endorsed. Partner physical abuse was defined as reporting at least one assaultive act of along with at least one impact. Qualifying impacts included victim injury or an exceptionally dangerous act that was judged likely to result in victim injury (e.g., choke).

**Partner Emotional Abuse.** Partner emotional abuse victimization was assessed by first asking participants whether, in the past year, they had ever been so down, depressed, or stressed that it affected them almost every day for two weeks. If they answered yes — or if their responses to the items on the earlier depressive symptoms indicated a significant current level of depression (sum of item responses  $\geq 13$ ) — participants were then asked how much of their sadness, depression, and/or stress was related to things their partners said or did. The next questions assessed how frequently in the past 12 months participants had feared for their own safety or that of someone they cared about due to their partners’ behavior, and whether fear of what their partners might do or say had interfered with their functioning.

All participants who indicated having experienced at least mild depression, stress, and/or

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<sup>1</sup> Because depressive symptoms were covered elsewhere in the survey, this item was modified from “During the past 12 months, how often did you feel sad and hopeless?”

fear as a result of their partners' behavior were then presented with a list of 9 specific acts and asked how often in the past year their partners had committed them (e.g., "put me down or humiliated me", "stalked me"). They were also asked whether another behavior not listed had occurred and given space to describe it. If at least one incident involving any of these acts was reported, participants were presented with each endorsed behavior in turn and asked whether said incident(s) had caused or contributed to the depression, stress, and/or fear they had reported earlier. Responses to the "write-in" item (i.e., "Did another similar behavior not listed here...") were later coded for whether or not they described an act of emotional aggression. Participants were classified as having been emotionally abused if they reported that in the past 12 months, (a) their partners had engaged at least one specific act of emotional aggression, and either (b) at least one specific act endorsed had caused the participant to experience fear, stress, or depression, or (c) the partner's behavior in general had caused the participant to fear for their own safety or that of someone they cared about, and this fear had interfered with the participant's functioning.

***Child Physical Assault and Abuse.*** When answering questions related to parent-child physical aggression, parents are understandably often reluctant to honestly report such if it has occurred. In an attempt to discourage underreporting due to social undesirability, the child physical maltreatment module of the CA was designed such that, rather than reporting the *frequencies* of acts of physical discipline, participating parents were offered the opportunity to report *reason(s)* for their behavior. That is, for each potential act (e.g., "I spanked the child on the bottom with a bare hand"), parents were presented with four possible response options for each of their children: "I did this to teach," "I did this to punish," "I did this because I was frustrated/lost my cool," and "I never did this." (This was done solely to encourage honest reporting; scoring procedures ignored which reason(s) were reported for any endorsed acts.)

Thus, parents were first asked, for each of up to four minor children, whether (and why) they had engaged in each of seven relatively mild discipline behaviors (e.g., spanked child on the bottom with a bare hand). Participants who endorsed any of the mild discipline behaviors with any of their children were further asked, for each child, whether (and why) each of 11 more severe strategies had been employed (e.g., hit child with a fist). From parents' responses, a "variety" score — i.e., the number of different acts endorsed as having been perpetrated, regardless of the reason(s) reported — was calculated for each child. The highest variety score for any one child in the family served as the continuous measure of child physical assault in the current study.

If at least one incident involving any act of physical discipline was reported, participants were presented with a list of all endorsed behaviors and asked whether said incident(s) had resulted in any of a range of injuries to the child. Parents who reported that one or more acts of physical discipline had injured any child in any way were classified as having committed child physical abuse, as were those who reported one or more acts with a high potential for injury.

***Child Emotional Assault and Abuse.*** The child emotional maltreatment module first asked parents how frequently in the past year they had committed each of seven emotionally aggressive acts (e.g., harmed something important to child (e.g., child's favorite object or pet) to send a message) against each of up to four minor children. Respondents could also indicate "other" and write in other acts which were coded by the investigators as partner physical assault or not. The past-year frequencies of two further acts were also assessed: (a) physically disciplining the child in a way that caused the child pain and (b) using verbal discipline harshly. However, these acts were only considered potentially abusive if they occurred more than once a week. The



continuous measure of child emotional assault consisted of the highest total frequency of emotionally aggressive acts against any one child in the family.

If at least one act of emotional assault was reported, participants were presented with a list of all endorsed acts and asked whether the acts had resulted in emotional harm to the relevant child. Parents who reported that one or more acts of emotional aggression had harmed a child in any way were classified as having committed child emotional abuse against that child.

## Data Management

### *Missing data*

The data from all individuals who logged into the survey ( $n = 54,543$ ) were examined. A few individuals ( $n = 1,369$ ) ended their participation without answering even the first few questions asking for basic demographics; these individuals were considered non-respondents and were removed from the dataset. Of those remaining, over 75% ( $n = 42,215$ ) continued responding until the end of the survey, while the rest ( $n = 10,959$ ) ended their participation at some point in between. Of these, all who had entered “Other” as their location rather than selecting a base and could therefore not be weighted ( $n = 305$ ) were removed from the dataset. Also, because it was likely that both members of at least a few dual-active-duty couples would have participated (creating possible problems of non-independence), we used several data points (i.e., gender, length of marriage, number, and ages of children in the home) to match these couples ( $n = 55$  couples). One member of each such couple was then randomly chosen and removed from the dataset, as were 34 individuals whose responses were suspect (e.g., individuals who reported that every possible type of partner assault occurred at maximum frequency).

Although the amount of missingness was lower than expected given the nature of the survey, it was not low enough to be ignored. Depending on the analyses to be performed, missing data points were dealt with via either (a) full-information maximum likelihood estimation or (b) multiple imputation, which minimizes bias in statistical estimates (e.g., prevalences of secretive problems) that would otherwise be produced if analyses were limited to only those cases with complete data (Schafer & Graham, 2002). To that end, after the remaining complete and partial CA responses were scored, significantly non-normal variables were transformed appropriately, and five multiply imputed datasets were then created using IVEware; analyses were then conducted separately in the five datasets and the results combined appropriately.

### *Weighting*

To correct for differential nonresponse and to make the sample representative of the AF population, sampling weights were created via raking, which uses iterative proportional fitting to match marginal distributions of a survey sample to known population margins. The raking process included all variables used in sampling (i.e., sex, race/ethnicity, marital status, religious faith, pay grade, and Air Force Specialty Code [AFSC] family), plus military installation. During this process, some weights, especially for those in very rare categories (e.g., Hispanic female officers) can become very large. Any weights more than four times larger or smaller than the size of the mean weight were trimmed to 4 or .25, respectively. This is typically done so that extreme weights do not overly influence results and create large sampling variances.

## Statistical Analyses

### *Algorithms*

The analytic methods are described alongside the results in the “Results” section below

for enhanced interpretability.

### *Risk and Protective Factors*

Hypothesized risk and protective factor relations were tested for alcohol problems, suicidal thoughts and behaviors, partner physical assault and abuse perpetration, partner emotional abuse victimization, child physical assault and abuse, and child emotional abuse.<sup>2</sup> To aid in testing interactive effects and in interpreting results of the risk and protective factor analyses, each continuous predictor was standardized using its overall grand mean and standard deviation. Each secretive problem underwent three sets of analyses: (a) tests of risk and promotive relations, (b) tests of protective/interactive relations, and (c) structural equation models.

*Tests of Risk and Promotive Relations.* Using the development samples, bivariate associations between suicidal ideation and each of the predictor variables were calculated using linear (for continuous outcomes) or logistic (for dichotomous outcomes) regression. In this way, significant risk and promotive factors were identified.<sup>3</sup> Further analysis aimed to distill all of the predictors down to the most important ones. The multivariate model-building process was conducted using those variables that demonstrated significant bivariate associations with suicidal ideation. Only those variables that demonstrated unique effects — i.e., were predictive of the relevant outcome even when controlling for the other variables in the model — were retained. These analyses were conducted using the full development subsample, within each ecological level (i.e., individual, family, workplace, and community), separately for men and women. All significant predictors from all levels were also entered together into a similar analysis to test for overall unique effects. The final regression models were then validated with fresh data from holdout subsamples. For more details, see the appended articles resulting from this work to date (Foran, Slep, Heyman, & USAF Family Advocacy Program, 2011; Langhinrichsen-Rohling, Snarr, Slep, Heyman, Foran, & USAF Family Advocacy Program, in press; Slep, Foran, Heyman, & Snarr, 2010; Slep, Foran, Heyman, Snarr, & USAF Family Advocacy Program, 2011).

*Tests of Protective/Interactive Relations.* Key risk factor relations were then investigated to examine hypothesized potential protective/interactive effects. Testing a hypothesized protective relation requires testing whether the interaction between the risk and protective factors is significant when predicting the dependent variable. These tests were conducted using simultaneous regression (i.e., linear regression for continuous outcomes and logistic regression for dichotomous outcomes). For each hypothesized interaction, a separate simultaneous regression model was tested with the two main effects and the interaction between them entered as predictors. A significant regression coefficient for the interaction term demonstrated support for the hypothesized protective/interactive relation moderating the effect of the risk factor. As with the tests of risk and promotive relations, significant models were then validated with fresh

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<sup>2</sup> Attempts were also made to examine various comorbid conditions [e.g., comorbid physical partner and child abuse]; however, due to the non-clinical nature of the sample, fewer people with these comorbid conditions participated than would have been necessary to obtain valid results. Child neglect was not investigated because it was not validly measured by the 2006 CA.

<sup>3</sup> Higher levels of risk factors are associated with increased risk, whereas higher levels of promotive factors are associated with decreased risk.

data from holdout subsamples. For more details, see the appended articles resulting from this work to date (Foran, Heyman, Slep, Snarr, & USAF Family Advocacy Program, 2011).

**Structural Equation Modeling.** Finally, where the regression analyses described above supported it (e.g., a moderate number of additive effects were retained in the multivariate risk and promotive factor regressions), we developed, tested, and cross-validated structural equation models. To maximize the generalizability and potential theoretical and practical impact of these analyses, (a) CA data from civilian spouses of AF active-duty members were also included, and (b) data were weighted to match the general U.S. population. For more details, see the appended articles resulting from this work to date (Foran, Heyman, Slep, & USAF Family Advocacy Program, in press; Slep, Foran, Snarr, Heyman, & USAF Family Advocacy Program, 2011).

## Results

As per the approved Statement of Work, the results described below have been presented at meetings with the Military Advisory Panel and in annual reports. Project goals, progress, and challenges were presented at all meetings with Military Advisory Panel beginning June, 2007 and concluding in January, 2011. In addition to these formal briefings and discussion, weekly telephone conferences were held with the acting AF research director to keep them informed of progress and discuss issues. Interim reports of analytic techniques used and results obtained were submitted to the acting AF mental health division research director as they became available for each dependent variable, approximately every six months, with more occurring during the final year of the project. Written summaries for all results completed were submitted to with Maj. Rachel Foster and Lt. Col. Carol Copeland, the AF division research director and Family Advocacy in 2010 at the conclusion of the project. These were discussed at an extended meeting in October 2010 at Stony Brook University. Final algorithm analyses were not completed until recently, are summarized in this report, and are scheduled to be presented to the new research director, Maj. Wendy Travis, on Aug 17, 2011 in San Antonio, TX. Thus, all reporting and briefing detailed in the statement of work has been accomplished.

## Algorithms

### Overview

The goal of the analyses was to develop “algorithms for accurately estimating the prevalences of secretive problems, obviating the need for direct assessment of secretive problems in the future.” To accomplish this goal, we first developed predictive models in one dataset, and then tested the accuracy of those models in a second dataset. Five sets of imputed data were generated (see “Missing Data” section above). Each of these five datasets was then randomly divided in half to form “Development” and “Validation” subsamples. Predictive equations for secretive problems rates were first generated via analyses within the Development sample. The performance of these equations in predicting the rates of secretive problems in a “fresh” set of data – the crucial step of cross-validation – was evaluated in the Validation sample. Each secretive problem was analyzed independently. All models were analyzed taking weights into account in order to better reflect the AF population (see “Weighting” section above).

### *Analyses in Development Sample: Generating the Predictive Equations*

There were five Development Sample datasets, corresponding to the 5 versions of the data generated by multiple imputation. Development Dataset 1 was treated differently than the rest. Statistical models were evaluated using the R statistical software package (<http://cran.r-project.org/>). Given the computationally intensive nature of the analyses in the Development Sample, it was necessary to utilize Stony Brook's "supercomputer" (parallel computing cluster). The models each took up to 200 hours of computing time to run. These analyses additionally required us to hire a programmer with expertise in programming related to parallel computing, as well as identify an additional collaborator with expertise in R and the UNIX operating system of the supercomputer.

**Step 1: Analyses within Development Dataset 1.** To minimize shrinkage on cross-validation that can result from analyses capitalizing on chance (often, variables that appear to be significant predictors do not hold up upon cross-validation), we created and separately analyzed 9 bootstrapped versions of this dataset. Within each of these 9 bootstrapped versions of Development Dataset 1, we (A) first conducted pre-screening to determine which interaction terms (i.e., predictor X predictor) needed to be evaluated in subsequent analyses. To do this, we computed the association of each 2-way interaction with each secretive problem. Each interaction whose association with a given secretive problem was statistically significant ( $p < .10$ ; a deliberately relaxed criterion to avoid premature pruning) was retained for further examination in relation to that secretive problem. In the next step (B), again separately within each of the 9 bootstrapped versions of Development Dataset 1, we conducted backward stepwise logistic regression, entering all predictors as well as the interaction terms identified above, to identify a set of predictors that made unique (i.e., non-redundant) contributions to the prediction of each secretive problem. In backward stepwise regression, each predictor must repeatedly "fight for its right to exist"; this is determined by whether model fit would be worsened by the predictor's elimination. Model selection was based on the Bayesian Information Criterion (BIC) method, to avoid overfitting (Kuha, 2004); the BIC penalizes one for model complexity and sample size. Additionally, interaction terms were always evaluated with their embedded main effects entered simultaneously. Predictors (both main effects and interactions) that were retained in a majority of bootstrapped datasets ( $\geq 5$  of 9) were further evaluated in Step 2; all other predictors were dropped from future consideration.

**Step 2: Analyses within Development Datasets 2-5.** Using the retained predictors from Step 1, we (A) conducted an additional set of backward stepwise logistic regression analyses on Development Datasets 2 through 5, using the same settings as described above. Predictors that were retained in 2 or more of the 4 datasets were further evaluated in the next step; all other predictors were dropped from future consideration. The extensive preliminary analyses of Step 1 yielded a very stable set of predictors for Step 2, in that most of the predictors evaluated in Step 2 were retained. The retained predictors from Step 2 were then advanced to the next stage (B) in which we conducted ordinary (i.e., not stepwise) logistic regression in which each secretive problem was simultaneously regressed on all predictors identified in Step 2A. These analyses were conducted separately in each of the 5 development datasets, hence producing 5 *final equations* for each secretive problem – one equation per dataset. The equations relate secretive problems to people's scores on the predictors. In the next step (C), these equations were applied to the observed data to generate *predicted probabilities* for each secretive problem. These probabilities represent the predicted chance that each person will report a given secretive

problem, given her/his unique set of scores on the predictors. We next (D) identified *cutpoints* in these predicted probabilities that reproduced the measured prevalence of each secretive problem. For example, if 560 people reported that they had misused prescription drugs, we identified the cutpoint that separated the top 560 people (i.e., those with the 560 highest predicted probabilities of prescription drug misuse) from the rest. The 5 sets of final equations and cutpoints are the end product of Step 2, generating the models we attempted to cross-validate in Step 3.

#### ***Analyses in Validation Sample: Testing the Predictive Equations***

There were five Validation Sample datasets, corresponding to the 5 versions of the data generated by multiple imputation. These analyses were run using the SPSS software package on an ordinary computer.

***Step 3: Compute the predicted and measured prevalences of secretive problems.*** We (A) took the 5 final equations and cutpoints from Step 2 and applied them to each of the five Validation Sample datasets. Within each dataset, each equation was applied to the observed data to generate people's predicted probabilities for each secretive problem. Each cutpoint was next applied to the predicted probabilities. Individuals falling at or above the cutpoint were classified as predicted "positives" for the secretive problem. We next computed *predicted prevalences* (# above the cutpoint, divided by the total number of subjects) for each of the 5 equations, within each of the 5 datasets. Averaging across these 25 predicted prevalences yielded the final predicted prevalence. We (B) also calculated the *measured prevalences* (i.e., the actual proportion of people who reported having a given secretive problem) separately in each of the 5 datasets. The average prevalence across these 5 datasets yielded the final measured prevalence. (C) The *difference* between predicted and measured prevalences was also calculated separately in each dataset and averaged to form an index of the degree to which our equations over- or under-predicted the measured prevalences of secretive problem. Results are presented for each secretive problem in Table 1.

***Step 4: Create final bootstrapped confidence intervals.*** In each imputed cross-validation dataset, we (A) created bootstrapped confidence intervals for each secretive problem for each of the 5 prediction equations described in Step 3. We then (B) averaged across each of these estimates for each secretive problem. The final bootstrapped 95% confidence intervals are reported in Table 1.

Table 1A

*Predicted and Measured Prevalences of Individual and Any Secretive Problems in the Validation Dataset*

	Any				
	Secretive Problem	Alcohol Problems	Rx Drug Misuse	Illicit Drug Use	Suicidality
Predicted Prevalence	24.42%	11.12%	2.45%	0.18%	4.18%
95% CI (low, high)	(23.78%, 25.06%)	(10.62%, 11.62%)	(2.20%, 2.70%)	(0.11%, 0.26%)	(3.87%, 4.49%)
Measured Prevalence	25.18%	12.28%	2.18%	0.33%	3.79%
95% CI (low, high)	(24.55%, 25.81%)	(11.79%, 12.78%)	(1.96%, 2.40%)	(0.24%, 0.42%)	(3.50%, 4.09%)
Difference	-0.75%	-1.17%	0.27%	-0.15%	0.38%

Note. CI = bootstrapped confidence interval.

Table 1B

*Predicted and Measured Prevalences of Family Secretive Problems in the Validation Dataset*

	M-to-F		F-to-M		Phys.	Emot.
	Phys. Abuse	M-to-F Emot. Abuse	Phys. Abuse	Emot. Abuse	Child Abuse	Child Abuse
Predicted Prevalence	1.72%	4.45%	2.14%	4.40%	7.09%	3.43%
95% CI (low, high)	(1.56%, 1.89%)	(4.19%, 4.71%)	(1.94%, 2.34%)	(4.13%, 4.67%)	(6.76%, 7.42%)	(3.19%, 3.67%)
Measured Prevalence	1.72%	10.89%	1.72%	5.74%	9.56%	4.22%
95% CI (low, high)	(1.52%, 1.83%)	(10.06%, 11.24%)	(1.58%, 1.92%)	(5.36%, 6.09%)	(9.18%, 10.04%)	(3.87%, 4.45%)
Difference	0.01%	-6.45%	0.42%	-1.35%	-2.47%	-0.79%

Note. CI = bootstrapped confidence interval, M = male, F = female, Phys. = physical, Emot. = emotional.

### Algorithms Results Summary

We were able to quite accurately predict the prevalences of individual secretive problems, *without asking directly about them*. Instead, asking people more innocuous questions (e.g., their gender, marital status, and sense of physical well being; Table 2), their answers to which we fed into our predictive equations or algorithms, was sufficient to estimate the prevalences of secretive problems with a reasonable degree of fidelity. The predicted prevalences of individual secretive problems were predominantly within 1% of the measured prevalences in

the population – on average they were about ½ of 1% off. The predicted prevalences of family problems, however, were more variable. The predicted rates of physical abuse and female-to-male emotional abuse in couples, as well as emotional child abuse, were close to the observed prevalences. In contrast, the equations underestimated the rate of physical child abuse and male-to-female partner emotional abuse, particularly the latter.

Table 2  
*Final Predictors of Secretive Problems*

Predictor	Secretive Problem										
	1	2	3	4	5	6	7	8	9	10	11
Presence of a child age 2 or below	X	X			X	X					
Child 2 or less X child 3 to 5						X					
Child age 2 or below X religious involvement	X										
Presence of a child age 12 to 17											X
Child 12 to 17 X number of children											X
Presence of a 3- to 5-year-old child	X	X				X	X	X		X	
Child age 3-5 X child age 6-11	X									X	
Child age 3-5 X financial stress	X										
Presence of a 6- to 11-year-old child	X				X					X	X
Child 6-11 X personal coping					X						
Child 6-11 X religious involvement	X										
Gender	X	X		X	X	X		X		X	
Gender X marital status	X										
Gender X physical wellbeing					X						
Gender X religious involvement	X										
Gender X neighborhood support				X							
Gender X quality work relationships				X							
Marital status	X	X									
Age		X	X								
Community safety					X						
Community safety X physical wellbeing					X						
Community unity	X								X		
Community unity X satisfaction with the AF									X		
Depressive symptoms	X	X	X		X		X	X	X	X	X
Financial stress	X	X	X		X	X		X	X		
Financial stress X satisfaction with the AF									X		
Family coping									X		X
Family coping X depressive symptoms											X
Weekly hours worked	X		X								
Length of marriage								X		X	
Number of years in the military	X		X			X					
Number of children	X							X		X	X
Personal coping	X	X			X						



Physical wellbeing	X	X	X	X	X						X
Physical wellbeing X religious involvement											X
Couple relationship satisfaction						X	X	X	X	X	
Relationship satisfaction X family coping									X		
Relationship satisfaction X number of children										X	
Satisfaction with the AF					X				X		
Spouse preparedness for deployment									X		X
Spouse preparedness for deployment X leadership support											X
Religious involvement	X	X	X							X	X
Leadership support		X	X								X
Leadership support X quality of work relationships			X								
Neighborhood support				X				X			
Weeks deployed		X			X						
Quality of work relationships			X	X							

*Note.* 1 = any problem, 2 = alcohol problems, 3 = Rx drug misuse, 4 = illicit drug use, 5 = suicidality, 6 = male-to-female physical abuse, 7 = male-to-female emotional abuse, 8 = female-to-male physical abuse, 9 = female-to-male emotional abuse, 10 = physical child abuse, 11 = emotional child abuse.

## Risk and Promotive Relations

### Alcohol Problems

Analyses using each of the potential risk and promotive factors to predict hazardous alcohol use were conducted using logistic regression. Bivariate odds ratios and confidence intervals are presented in Table 3. All hypothesized predictors significantly differentiated men's risk for hazardous drinking; all hypothesized individual level predictors and most hypothesized predictors at the other levels were also significantly related to women's risk for hazardous drinking.

**Did risk and promotive factors from all four ecological levels uniquely differentiate hazardous from non-hazardous drinkers?** Yes, but only if the final overall models for both men and women were examined (see Tables 4 & 5, respectively). Final overall models for men comprised individual, family, and workplace factors; final overall models for women included individual, family, and community factors. Although community factors for men and workplace factors for women were bivariately predictive of hazardous drinking, all such variables dropped out in the context of predictors from other ecological levels. The strongest unique predictors for both men and women were depressive symptoms, family income, and number of children.

**Did the same risk and promotive factors that predict hazardous drinking predict drinking problem severity among male hazardous drinkers?** Some did, but many did not (see Table 6). For men, religious involvement and developmental variables such as years in the military, marital length and number of children, predicted risk for hazardous drinking, but not severity among those at risk. On the other hand, poor personal coping, higher relationship dissatisfaction, and lower family income were consistent unique predictors of both risk for hazardous drinking



and severity among men, indicating they may be particularly important variables to understanding hazardous drinking, in general. Only individual and family level variables predicted severity for women with drinking problems. This indicates that intervention efforts may be most effective with women seeking treatment for alcohol-related problems if they target coping skills, depressive symptoms, and relationship problems.

It is also notable that two community variables (community safety, support from formal agencies) and one workplace variable (hours worked) did not uniquely predict hazardous versus non-hazardous drinking across all levels, but were unique predictors of severity among male hazardous drinkers. Furthermore, two other workplace factors (workgroup cohesion and satisfaction with the Air Force) uniquely predicted risk for hazardous drinking, but not severity. This highlights viable areas to target in terms of community and organizational level prevention.

Table 3

*Descriptive Statistics and Bivariate Relations among Predictor Variables, Hazardous Drinking, and Problem Severity*

<u>Individual Level</u>	<u>M(SD)</u>	Men		<u>r</u>	Women	
		Non-hazardous vs. hazardous drinkers <sup>a</sup>	Severity of hazardous drinkers <sup>b</sup>		Non-hazardous vs. hazardous drinkers <sup>a</sup>	Severity of hazardous drinkers <sup>b</sup>
		<u>OR (95<sup>th</sup> % CI)</u>			<u>OR (95<sup>th</sup> % CI)</u>	
Years in military	9.88(7.19)	0.53(0.50-0.56)***	-0.07***	7.35(6.05)	0.57(0.47-0.69)***	0.00
Financial Stress	1.82(0.87)	1.35(1.30-1.40)***	0.09***	1.76(0.88)	1.51(1.34-1.70)***	0.06
Depressive Symptoms	1.54(0.63)	1.59(1.53-1.66)***	0.10***	1.64(0.64)	1.65(1.46-1.86)***	0.12*
Personal Coping	4.14(0.49)	0.70(0.63-0.70)***	-0.16***	4.02(0.52)	0.66(0.59-0.74)***	-0.13*
Physical Well-being	4.14(0.72)	0.76(0.71-0.80)***	-0.10***	4.02(0.73)	0.78(0.70-0.87)***	-0.07
Religious involvement	3.09(1.04)	0.67(0.65-0.79)***	-0.04	3.22(0.94)	0.70(0.61-0.80)***	-0.03
<u>Family Level</u>						
Support from Sign. Other	4.90(1.03)	0.79(0.75-0.83)***	-0.12***	5.25(0.93)	0.75(0.66-0.85)***	-0.24**
Relationship Satisfaction	5.83(1.09)	0.78(0.74-0.82)***	-0.12***	5.90(1.12)	0.79(0.67-0.94)**	-0.24**
Number of Children	0.93(1.13)	0.56(0.53-0.60)***	-0.03	0.64(0.90)	0.44(0.32-0.59)***	-0.04
Family Income (US \$ mo.)	5652(3223)	0.45(0.42-0.48)***	-0.09***	6306(4234)	0.54(0.46-0.63)***	0.05
Marital Length	8.43(6.80)	0.66(0.61-0.71)***	-0.04	5.55(5.69)	0.80(0.56-1.14)	-0.10
Family Coping	4.99(0.98)	0.79(0.74-0.84)***	-0.13**	5.21(0.88)	0.69(0.57-0.84)***	-0.34**
Spouse Deployment Support	3.14(0.79)	0.82(0.77-0.88)***	-0.12***	3.15(0.90)	1.03(0.83-1.29)	-0.22
Parent Child Relations	5.08(0.72)	0.77(0.71-0.84)***	-0.12***	5.20(0.73)	0.71(0.54-0.94)*	-0.16
Child Physical Aggression	1.10(1.24)	1.29(1.18-1.39)***	-0.04	1.22(1.37)	1.08(0.82-1.42)	0.05
Partner Aggression	0.12(0.59)	1.24(1.18-1.30)***	0.17***	0.22(0.90)	1.21(1.11-1.32)***	0.01
<u>Workplace Level</u>						
Support from Leadership	4.11(0.89)	0.80(0.77-0.84)***	-0.13***	4.10(0.88)	0.77(0.69-0.88)***	0.04
Satisfaction with AF	4.16(1.11)	0.73(0.69-0.76)***	-0.09***	4.31(1.14)	0.71(0.62-0.80)***	-0.03
Workgroup Cohesion	4.12(1.10)	0.73(0.69-0.76)***	-0.11***	3.94(1.14)	0.77(0.67-0.89)***	-0.04

Work Relations	3.92(0.87)	0.82(0.79-0.85) <sup>***</sup>	-0.10 <sup>***</sup>	3.74(0.92)	0.85(0.74-0.97) <sup>*</sup>	-0.06
Weeks deployed	8.12(11.17)	1.05(1.00-1.09) <sup>*</sup>	0.02	5.55(5.69)	1.02(0.90-1.16)	0.08
Hours Worked	40.99(4.35)	1.04(1.00-1.09) <sup>*</sup>	0.09 <sup>***</sup>	40.71(3.58)	1.14(1.03-1.27) <sup>*</sup>	0.03

#### Community Level

Community Unity	4.11(0.84)	0.80(0.76-0.84) <sup>***</sup>	-0.10 <sup>***</sup>	4.16(0.82)	0.76(0.68-0.86) <sup>***</sup>	0.04
Support from Neighbors	4.51(1.03)	0.81(0.77-0.84) <sup>***</sup>	-0.07 <sup>**</sup>	4.36(1.06)	0.94(0.83-1.05)	0.09
Support for Youth	4.32(0.97)	0.82(0.78-0.86) <sup>***</sup>	-0.11 <sup>***</sup>	4.37(0.97)	0.84(0.74-0.96) <sup>*</sup>	0.03
Support from Formal agencies	4.37(0.94)	0.81(0.77-0.84) <sup>***</sup>	-0.15 <sup>***</sup>	4.52(0.92)	0.78(0.70-0.88) <sup>***</sup>	-0.04
Social Support	4.23(1.38)	0.91(0.87-0.96) <sup>***</sup>	-0.19 <sup>***</sup>	4.23(1.48)	0.98(0.87-1.09)	-0.02
Community Safety	5.03(0.76)	0.85(0.81-0.89) <sup>***</sup>	-0.15 <sup>***</sup>	4.95(0.81)	0.81(0.73-0.90) <sup>***</sup>	-0.04
Community Stress	4.11(0.91)	1.24(1.19-1.30) <sup>***</sup>	0.11 <sup>***</sup>	4.14(0.90)	1.22(1.09-1.37) <sup>**</sup>	0.03

*Note.* OR = Odds Ratios. CI = Confidence Interval. Results are presented for development sample;  $n = 20,920$  men and  $n = 5,469$  women for all variables except those that were only answerable by individuals in relationships (relationship satisfaction, partner aggression, support from significant other:  $n = 17,317$  men and  $n = 4,012$  women), married individuals (marital length, spouse deployment support:  $n = 14,979$  men and  $n = 2,939$  women), married individuals or parents (family coping:  $n = 15,579$  men and  $n = 3,600$  women), parents (child physical aggression and parent child relations:  $n = 11,531$  men and  $n = 2,434$  women). <sup>a</sup>This column compares those that scored  $< 8$  on the AUDIT to those individuals that scored  $> 8$ . <sup>b</sup>This column presents correlations ( $r$ ) of AUDIT scores between 8 and 40 (13.7% of men and 6.0% of women in the sample) with predictor variables.

<sup>\*</sup> $p < .05$ . <sup>\*\*</sup> $p < .01$ . <sup>\*\*\*</sup> $p < .001$ .

Table 4

*Stepwise Regression Analyses of Hazardous versus Non-Hazardous Male Drinkers*

	<u>Development Sample</u>			<u>Cross-Validation</u>	<u>Generalizability Rubin's F</u>		
	<i>b</i>	<i>SE</i>	<i>Wald's statistic</i>	Rubin's <i>F</i>	Marital Status	Region	City Size <sup>a</sup>
<u>Overall</u>							
Personal Coping	-0.07	0.03	5.76*	0.89	2.27*	1.11	1.18
Depressive Symptoms	0.28	0.03	152.41***				
Religious Involvement	-0.26	0.03	127.08***				
Years in Military	-0.22	0.04	32.14***				
Financial Stress	0.16	0.02	52.27***				
Number of Children	-0.31	0.04	73.64***				
Family Income	-0.33	0.05	52.55***				
Satisfaction with AF	-0.08	0.02	9.97**				
Work Group Cohesion	-0.06	0.03	5.02*				
<u>Overall in Relationships<sup>b</sup></u>							
Depressive Symptoms	0.27	0.03	85.31***	0.75	0.93	0.94	1.04
Religious Involvement	-0.27	0.03	103.29***				
Years in Military	-0.26	0.05	31.66***				
Financial Stress	0.12	0.04	11.71**				
Number of Children	-0.28	0.04	53.07***				
Family Income	-0.27	0.06	22.65***				
Satisfaction with AF	-0.07	0.03	5.45*				
Work Group Cohesion	-0.11	0.03	11.13**				
Relationship Satisf.	-0.14	0.03	21.79***				
Partner Aggression	0.09	0.03	14.59***				
<u>Overall in Relationships with Children<sup>b</sup></u>							
Depressive Symptoms	0.29	0.04	49.31***	0.27	0.87	1.23	0.58
Religious Involvement	-0.28	0.05	36.33***				
Years in Military	-0.28	0.05	27.56***				
Financial Stress	0.14	0.04	9.64**				
Child Phy. Aggression	0.15	0.04	11.65**				
Partner Aggression	0.08	0.04	4.07*				
Work Group Cohesion	-0.12	0.05	5.24*				
Relationship Satisf.	-0.14	0.04	14.22***				
<u>Individual Level</u>							
Personal Coping	-0.12	0.03	19.35***	1.18	3.14*	1.65	1.25
Depressive Symptoms	0.32	0.02	207.79***				

Religious Involvement	-0.31	0.02	204.40***
Years in Military	-0.54	0.03	386.00***
Financial Stress	0.15	0.02	51.76***

#### Family Level

Family Income	-0.64	0.03	412.05***	1.37	8.57***	1.58	0.43
Number of Children	-0.37	0.03	124.31***				

#### Family Level – In Relationships<sup>b</sup>

Family Income	-0.56	0.04	209.22***	0.90	2.64*	0.80	0.65
Number of Children	-0.36	0.03	115.97***				
Relationship Satisf.	-0.20	0.03	51.35***				
Partner Aggression	0.12	0.02	25.20***				
Sup. from Sign. Other	-0.12	0.03	18.39***				

#### Family Level – In Relationships with Children<sup>b</sup>

Family Income	-0.35	0.06	39.30***	0.51	1.51	1.36	0.43
Number of Children	-0.17	0.06	8.38**				
Relationship Satisf.	-0.18	0.04	19.76***				
Partner Aggression	0.10	0.04	19.04***				
Sup. from Sign. Other	-0.12	0.04	7.52**				
Parent-child Relations	-0.15	0.05	9.21**				
Child Phy. Aggression	0.19	0.05	9.21**				

#### Family Level – Married<sup>b</sup>

Family Income	-0.27	0.05	32.45***	0.94	---	0.91	0.52
Number of Children	-0.21	0.04	30.47***				
Relationship Satisf.	-0.15	0.04	15.25***				
Partner Aggression	0.13	0.03	22.77***				
Sup. from Sign. Other	-0.12	0.04	10.82**				
Marital Length	-0.20	0.05	17.11***				
Family Coping	-0.11	0.04	6.03*				

#### Family Level – Married with Children<sup>b</sup>

Family Income	-0.22	0.06	12.40***	0.34	---	1.15	0.71
Number of Children	-0.13	0.06	4.56*				
Relationship Satisf.	-0.18	0.04	17.07***				
Partner Aggression	0.12	0.04	9.01**				
Sup. from Sign. Other	-0.12	0.05	6.79**				
Marital Length	-0.17	0.05	7.11**				
Parent-child Relations	-0.15	0.05	7.51**				
Child Phy. Aggression	0.17	0.05	13.05***				

Organization Level

Satisfaction with AF	-0.23	0.02	100.12***	1.26	9.20***	0.86	1.19
Work Group Cohesion	-0.23	0.03	83.14***				

Community Level

Community Stress	0.09	0.03	10.29**	1.28	2.24	1.25	0.88
Support from Neighbors	-0.13	0.02	30.63***				
Sup. from Formal Ag.	-0.12	0.03	17.09***				
Community Safety	-0.06	0.03	5.08*				

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*Note.* Development Sample:  $n = 20,920$ . Validation Sample:  $n = 20,921$ . <sup>a</sup>City size  $n = 34,892$ . <sup>b</sup>Subsample analysis of dating, married, and/or parents,  $ns = 11,531$ – $17,317$ . Sup. from Sign. Other = Career Support from Significant Other. Child Phy. Aggression = Child Physical Aggression. Sup. from Formal Ag. = Support from Formal Agencies. Relationship Satisf. = Relationship Satisfaction.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 5

*Stepwise Regression Analyses of Hazardous versus Non-Hazardous Women Drinkers*

	<u>Development Sample</u>			<u>Cross-Validation</u>	<u>Generalizability Rubin's F</u>		
	<i>b</i>	<i>SE</i>	<i>Wald's statistic</i>	Rubin's <i>F</i>	Marital Status	Region	City Size <sup>a</sup>
<u>Overall</u>							
Depressive Symptoms	0.33	0.07	20.30***	1.43	2.48*	0.97	0.76
Religious Involvement	-0.23	0.08	9.39**				
Financial Stress	0.28	0.08	12.12***				
Number of Children	-0.71	0.17	17.55***				
Family Income	-0.37	0.09	18.39***				
Community Unity	-0.13	0.06	4.09*				
<u>Overall in Relationships<sup>b</sup></u>							
Depressive Symptoms	0.41	0.10	17.82***	1.38	0.41	0.53	0.67
Religious Involvement	-0.26	0.09	7.98**				
Partner Aggression	0.12	0.05	6.16*				
Number of Children	-0.47	0.18	7.03**				
Family Income	-0.39	0.09	16.79***				
Community Unity	-0.22	0.09	6.06*				
<u>Individual Level</u>							
Personal Coping	-0.15	0.06	5.32**	0.89	1.86	0.22	0.39
Depressive Symptoms	0.30	0.08	15.34***				
Religious Involvement	-0.27	0.08	12.88***				
Years in Military	-0.41	0.10	16.84***				
Financial Stress	0.26	0.07	13.78***				
<u>Family Level</u>							
Number of Children	-0.60	0.16	14.20***	0.34	6.15**	1.34	0.63
Family Income	-0.49	0.08	37.34***				
<u>Family Level – In Relationships<sup>b</sup></u>							
Number of Children	-0.50	0.17	8.18**	0.00	0.75	0.68	0.43
Family Income	-0.41	0.09	19.30***				
Partner Aggression	0.14	0.05	8.47**				
Sup. from Sign. Other	-0.25	0.07	13.60***				
<u>Family Level – in Relationships with Children<sup>b</sup></u>							
Number of Children	-0.81	0.29	7.71**	1.81	0.22	0.95	0.98
Parent-child Relations	-0.38	0.14	7.49**				

Organization Level

Hours worked	0.13	0.05	5.33*	1.25	1.05	0.43	0.43
Satisfaction with AF	-0.34	0.06	29.80***				

Community Level

Community Unity	-0.22	0.06	13.56***	2.80	0.24	0.42	0.29
Community Safety	-0.17	0.06	9.53**				

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*Note.* Development Sample:  $n = 5,469$ . Validation Sample:  $n = 5,470$ . <sup>a</sup>City size  $n = 9,131$ . <sup>b</sup>Subsample analysis of dating, married, and/or parents  $ns = 2,434 - 4,012$ . Sup. from Sign. Other = Career Support from Significant Other. \* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$ .



Table 6  
*Stepwise Linear Regression Analyses of Problem Severity among Men Hazardous Drinkers*

	<u>Development Sample</u>			<u>Cross-Validation</u>	<u>Generalizability Rubin's <i>F</i></u>		
	<i>b</i>	<i>SE</i>	<i>t</i>	Rubin's <i>F</i>	Marital Status	Region	City Size
<u>Overall</u>							
Personal Coping	-0.07	0.01	-5.12***	1.03	0.52	0.77	0.36
Community Safety	-0.05	0.01	-4.26***				
Sup. from Formal Ag.	-0.07	0.01	-4.94***				
Family Income	-0.08	0.02	-4.40***				
Hours Worked	0.05	0.01	4.34***				
<u>Overall in Relationships</u>							
Personal Coping	-0.05	0.02	-3.08**	2.39*	1.64	0.48	0.86
Sup. from Formal Ag.	-0.08	0.02	-4.80***				
Family Income	-0.08	0.02	-3.72***				
Hours Worked	0.03	0.02	2.31*				
Relationship Satisfaction	-0.04	0.02	-2.33*				
Partner Aggression	0.06	0.01	5.07***				
<u>Individual Level</u>							
Personal Coping	-0.08	0.01	-6.01***	1.35	0.35	0.87	0.84
Physical Well-being	-0.03	0.01	-2.43*				
Years in Military	-0.05	0.02	-3.34**				
Financial Stress	0.03	0.01	2.37*				
<u>Family Level</u>							
Family Income	-0.09	0.02	-4.63***	0.10	0.77	0.47	0.85
<u>Family Level – In Relationships</u>							
Family Income	-0.08	0.02	-3.59***	1.87	1.77	0.79	0.79
Relationship Satisf.	-0.05	0.02	-2.50*				
Partner Aggression	0.07	0.01	5.44***				
Sup. from Sign. Other	-0.04	0.01	-2.59*				
<u>Organization Level</u>							
Support Leadership	-0.07	0.02	-4.85***	0.41	0.45	0.63	0.72
Work Relations	-0.04	0.01	-2.71**				
Hours Worked	0.05	0.01	4.32***				

Community Level

Sup. from Formal Ag.	-0.08	0.01	-5.91***	1.14	0.32	0.48	0.75
Community Safety	-0.07	0.01	-5.38***				

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*Note.* Sup. from Formal Ag. = Support from Formal Agencies. Sup. from Sign. Other = Career Support from Significant Other. Relationship Satisf. = Relationship Satisfaction.  
\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

### *Suicidal Thoughts*

Descriptive statistics and bivariate odds ratios are presented in Table 7. Because the predictors had been standardized, each odds ratio (OR) represents the multiplicative increase (for risk factors) or decrease (for promotive factors) in the odds of suicidality (i.e., the ratio of suicidal participants to non-suicidal participants), given a one-standard-deviation increase in the predictor variable. To aid in comparing the effects of risk versus promotive factors, we also present “absolute” odds ratios ( $|OR|$ ), which are the increases in odds of suicidal ideation given a shift in a direction that increases risk (i.e., higher for risk factors, lower for promotive factors). As hypothesized, depression was the strongest predictor of reported suicide ideation for both AF men and women, and as expected, most of the tested variables were significantly related to suicidal ideation for both men and women. Indeed, all variables from all four levels of influence predicted men’s suicidal ideation, and only two of the variables tested—number of children and religious involvement—failed to reach statistical significance for women.

**Did risk and promotive factors from all four ecological levels uniquely differentiate suicidal from non-suicidal individuals?** Yes. (See Table 8.) Although depressive symptoms were by far the strongest predictor of suicidal thoughts, other individual- (alcohol problems), family- (relationship satisfaction and intimate partner victimization), workplace- (hours worked), and community-level (social support) variables were retained in the final multivariate models for both men and women. Some sex differences in retained predictors were noted (e.g., men — dissatisfaction with the Air Force way of life; women — workplace relationship satisfaction and financial stressors). These findings illustrate the importance of attending to multiple levels of potential influence when designing integrated suicide prevention and intervention programs.

Table 7

*Bivariate Odds Ratios and 95% Confidence Intervals for Factors Predicting Suicidal Ideation*

Variable	Men				Women			
	<i>M (SD)</i>	<i>OR</i>	<i>95% CI</i>	<i> OR </i>	<i>M (SD)</i>	<i>OR</i>	<i>95% CI</i>	<i> OR </i>
Individual Variables								
Depressive symptoms	1.76 (0.80)	<b>2.69</b>	<b>2.41–3.01</b>	<b>2.69</b>	1.77 (0.73)	<b>2.49</b>	<b>2.02–3.08</b>	<b>2.49</b>
Personal coping	4.05 (0.58)	<b>0.44</b>	<b>0.40–0.49</b>	<b>2.28</b>	3.97 (0.54)	<b>0.60</b>	<b>0.51–0.71</b>	<b>1.66</b>
Physical well being	4.01 (0.75)	<b>0.49</b>	<b>0.44–0.54</b>	<b>2.05</b>	3.98 (0.76)	<b>0.62</b>	<b>0.54–0.71</b>	<b>1.61</b>
Financial stress	1.87 (0.94)	<b>1.64</b>	<b>1.52–1.78</b>	<b>1.64</b>	1.78 (0.90)	<b>1.61</b>	<b>1.40–1.86</b>	<b>1.61</b>
Alcohol problems	4.34 (4.82)	<b>1.46</b>	<b>1.34–1.60</b>	<b>1.46</b>	2.88 (3.25)	<b>1.27</b>	<b>1.08–1.48</b>	<b>1.27</b>
Religious involvement	3.04 (1.07)	<b>0.73</b>	<b>0.67–0.80</b>	<b>1.37</b>	3.12 (1.01)	0.94	0.81–1.09	1.07
Years in military	11.05 (7.36)	<b>0.84</b>	<b>0.77–0.92</b>	<b>1.19</b>	8.19 (6.17)	<b>0.75</b>	<b>0.62–0.92</b>	<b>1.33</b>
Family Variables								
Relationship satisfaction <sup>a</sup>	5.65 (1.25)	<b>0.57</b>	<b>0.52–0.63</b>	<b>1.74</b>	5.79 (1.23)	<b>0.70</b>	<b>0.59–0.83</b>	<b>1.43</b>
Parent–child relationship satisfaction <sup>b</sup>	5.05 (0.80)	<b>0.64</b>	<b>0.55–0.75</b>	<b>1.56</b>	5.18 (0.74)	<b>0.64</b>	<b>0.51–0.81</b>	<b>1.55</b>
Spouse preparedness for deployment <sup>c</sup>	3.10 (0.84)	<b>0.66</b>	<b>0.58–0.75</b>	<b>1.52</b>	3.14 (0.89)	<b>0.76</b>	<b>0.61–0.95</b>	<b>1.32</b>
IPV victimization <sup>a</sup>	0.85 (3.75)	<b>1.36</b>	<b>1.25–1.47</b>	<b>1.36</b>	0.51 (2.77)	<b>1.31</b>	<b>1.12–1.53</b>	<b>1.31</b>
Number of children	0.97 (1.14)	<b>0.75</b>	<b>0.68–0.84</b>	<b>1.33</b>	0.77 (1.00)	0.92	0.76–1.11	1.09
Workplace Variables								
Dissatisfaction with the Air Force	3.99 (1.18)	<b>2.03</b>	<b>1.84–2.24</b>	<b>2.03</b>	4.19 (1.18)	<b>1.63</b>	<b>1.35–1.97</b>	<b>1.63</b>
Workplace relationship satisfaction	3.83 (0.92)	<b>0.58</b>	<b>0.53–0.63</b>	<b>1.72</b>	3.72 (0.91)	<b>0.74</b>	<b>0.65–0.84</b>	<b>1.36</b>
Support from leadership	4.03 (0.93)	<b>0.58</b>	<b>0.53–0.64</b>	<b>1.72</b>	3.99 (0.90)	<b>0.66</b>	<b>0.57–0.76</b>	<b>1.52</b>
Workgroup cohesion	4.03 (1.13)	<b>0.55</b>	<b>0.49–0.62</b>	<b>1.61</b>	3.81 (1.16)	<b>0.70</b>	<b>0.59–0.82</b>	<b>1.43</b>
Weekly hours worked	41.12 (4.75)	<b>1.22</b>	<b>1.14–1.30</b>	<b>1.22</b>	40.68 (3.25)	<b>1.21</b>	<b>1.03–1.42</b>	<b>1.21</b>
Community Variables								
Community unity	4.01 (0.89)	<b>0.54</b>	<b>0.49–0.60</b>	<b>1.84</b>	4.06 (0.84)	<b>0.64</b>	<b>0.55–0.73</b>	<b>1.57</b>
Community resources	4.03 (0.95)	<b>0.56</b>	<b>0.51–0.62</b>	<b>1.78</b>	4.02 (0.93)	<b>0.73</b>	<b>0.63–0.85</b>	<b>1.37</b>
Social support	4.13 (1.40)	<b>0.62</b>	<b>0.57–0.68</b>	<b>1.61</b>	4.15 (1.44)	<b>0.79</b>	<b>0.69–0.91</b>	<b>1.26</b>
Community safety	5.00 (0.84)	<b>0.72</b>	<b>0.67–0.78</b>	<b>1.39</b>	5.00 (0.75)	<b>0.80</b>	<b>0.68–0.93</b>	<b>1.26</b>

*Note.* OR = odds ratio, the natural exponentiation of the logistic regression coefficient ( $e^b$ ).  $|OR|$  = the natural exponentiation of the absolute value of the logistic regression coefficient ( $e^{|b|}$ ). All results were computed using the development subsamples only. **Bold text** indicates a significant odds ratio ( $p < .05$ ). Weighted  $n = 2,963$  men and 1,173 women unless otherwise indicated.

<sup>a</sup> $n = 2,238$  men and 833 women. <sup>b</sup> $n = 1,314$  men and 464 women. <sup>c</sup> $n = 1,721$  men and 509 women.

Table 8

*Final Multivariate Regression Models Predicting Suicidal Ideation*

Variable	Men ( <i>n</i> = 2963) <sup>a</sup>						Women ( <i>n</i> = 1173) <sup>a</sup>					
	By Ecological Level			All Levels Combined			By Ecological Level			All Levels Combined		
	<i>R</i> <sup>2</sup> <sub>L</sub>	<i>OR</i>	<i>OR</i>	<i>R</i> <sup>2</sup> <sub>L</sub>	<i>OR</i>	<i>OR</i>	<i>R</i> <sup>2</sup> <sub>L</sub>	<i>OR</i>	<i>OR</i>	<i>R</i> <sup>2</sup> <sub>L</sub>	<i>OR</i>	<i>OR</i>
OVERALL	—	—	—	.28			—	—	—	.20		
Individual Level	.24						.18					
Depressive symptoms		<b>2.04</b>	<b>2.04</b>		<b>1.99</b>	<b>1.99</b>		<b>2.20</b>	<b>2.20</b>		<b>2.25</b>	<b>2.25</b>
Personal coping		<b>0.67</b>	<b>1.48</b>		<b>0.76</b>	<b>1.31</b>		<b>0.83</b>	<b>1.21</b>		<i>0.96</i>	<i>1.04</i>
Physical well being		<b>0.86</b>	<b>1.16</b>		<b>0.91</b>	<b>1.10</b>		<i>0.96</i>	<i>1.04</i>		<i>0.95</i>	<i>1.05</i>
Financial stress		<b>1.16</b>	<b>1.16</b>		<i>1.08</i>	<i>1.08</i>		<b>1.30</b>	<b>1.30</b>		<b>1.22</b>	<b>1.22</b>
Alcohol problems		<b>1.15</b>	<b>1.15</b>		<b>1.11</b>	<b>1.11</b>		<b>1.12</b>	<b>1.12</b>		<b>1.22</b>	<b>1.22</b>
Years in military		<b>1.10</b>	<b>1.10</b>		<i>1.07</i>	<i>1.07</i>		<i>0.92</i>	<i>1.09</i>		<i>0.98</i>	<i>1.02</i>
Religious involvement		<i>0.95</i>	<i>1.05</i>		<i>1.02</i>	<i>1.02</i>		—	—		—	—
Family Level	.09						.04					
Relationship satisfaction		<b>0.60</b>	<b>1.66</b>		<b>0.80</b>	<b>1.25</b>		<b>0.73</b>	<b>1.38</b>		<b>0.85</b>	<b>1.17</b>
Number of children		<b>0.80</b>	<b>1.24</b>		<i>0.97</i>	<i>1.03</i>		—	—		—	—
IPV victimization		<b>1.23</b>	<b>1.23</b>		<b>1.17</b>	<b>1.17</b>		<b>1.23</b>	<b>1.23</b>		<b>1.15</b>	<b>1.15</b>
Workplace Level	.12						.06					
Dissatisfaction with the Air Force		<b>1.59</b>	<b>1.59</b>		<b>1.19</b>	<b>1.19</b>		<b>1.45</b>	<b>1.45</b>		<i>0.98</i>	<i>1.02</i>
Workplace relationship satisfaction		<b>0.74</b>	<b>1.36</b>		<i>0.92</i>	<i>1.09</i>		<b>0.85</b>	<b>1.18</b>		<b>0.89</b>	<b>1.13</b>
Weekly hours worked		<b>1.19</b>	<b>1.19</b>		<b>1.11</b>	<b>1.11</b>		<b>1.21</b>	<b>1.21</b>		<b>1.11</b>	<b>1.11</b>
Support from leadership		<b>0.84</b>	<b>1.19</b>		<i>1.04</i>	<i>1.04</i>		<b>0.79</b>	<b>1.27</b>		<i>0.93</i>	<i>1.08</i>
Workgroup cohesion		<b>0.91</b>	<b>1.10</b>		<i>1.04</i>	<i>1.04</i>		<i>0.97</i>	<i>1.04</i>		<i>1.00</i>	<i>1.00</i>
Community Level	.09						.04					
Community unity		<b>0.70</b>	<b>1.42</b>		<b>0.79</b>	<b>1.26</b>		<b>0.70</b>	<b>1.42</b>		<i>0.95</i>	<i>1.06</i>
Community resources		<b>0.78</b>	<b>1.29</b>		<i>1.07</i>	<i>1.07</i>		<b>0.91</b>	<b>1.10</b>		<i>0.94</i>	<i>1.06</i>
Social support		<b>0.77</b>	<b>1.29</b>		<b>0.87</b>	<b>1.15</b>		<b>0.91</b>	<b>1.10</b>		<b>0.90</b>	<b>1.11</b>
Community safety		<b>0.91</b>	<b>1.10</b>		<i>1.01</i>	<i>1.01</i>		<b>0.89</b>	<b>1.12</b>		<i>1.08</i>	<i>1.08</i>

*Note.* All *ns* indicate weighted participant counts. *R*<sup>2</sup><sub>L</sub> = the likelihood ratio *R*<sup>2</sup> (McFadden, 1974; Menard, 2000). *OR* = odds ratio, the natural exponentiation of the logistic regression coefficient (*e*<sup>*b*</sup>). |*OR*| = the natural exponentiation of the absolute value of the logistic regression coefficient (*e*<sup>|*b*|</sup>). All results computed using development subsamples only. **Bold text** indicates multivariate odds ratios included in the final model. *Italicized*

*text* indicates an odds ratio that would be obtained if its predictor variable were to be added next to the final model. <sup>a</sup>For the family and overall models,  $n = 2,238$  men and 833 women.

### *Suicidal Behavior*

Analyses of suicidal behavior (i.e., suicide attempts) attempted to differentiate suicidal individuals who reported at least one nonfatal suicide attempt in the past year from suicidal individuals who reported no suicide attempts in the past year.

Descriptive statistics and bivariate odds ratios are presented in Table 9. To aid in comparing the effects of risk versus promotive factors, we also present “absolute” odds ratios, which are the increases in odds of suicidal behavior given a one-standard-deviation shift in a direction that increases risk (i.e., higher for risk factors, lower for promotive factors). Interestingly, although depressive symptoms were by far the strongest predictor of suicidal ideation (see Table 7), depression was not one of the strongest predictors of attempts among ideators. Other variables from all four levels of influence did, however, significantly predict men’s suicidal behavior. Among women, although many effect sizes were comparable to those for men, only one variable significantly predicted risk of a suicide attempt — partner assault victimization. The gender discrepancy is most likely due to there being four times as many men as women in the active-duty sample (and in the USAF), which resulted in the presence of only a few female suicide attempters ( $n = 17$ ) in the sample, leading to low statistical power for these analyses.

**Did risk and promotive factors from all four ecological levels uniquely differentiate suicide attempters from suicidal ideators?** Yes, but only bivariate. When multivariate risk and promotive effects were estimated and cross-validated for suicidal AD men (see Table 10), no workplace-level variables were retained. The final overall model consisted of an individual-level variable (alcohol problems), a family-level variable (number of children), and a community-level variable (social support). In the model for men with families, family coping replaced social support. It should be also noted that when analyses were restricted to fathers only, number of children did not remain as a significant predictor in the model; this implies that it is parental status (i.e., having at least one child) that matters, rather than the number of children per se.

Table 9

*Bivariate Odds Ratios and 95% Confidence Intervals for Potential Risk/Protective Factors Predicting Suicidal Behavior in Suicidal Ideators*

Variable	Men				Women			
	<i>M (SD)</i>	<i>OR</i>	<i>95% CI</i>	<i> OR </i>	<i>M (SD)</i>	<i>OR</i>	<i>95% CI</i>	<i> OR </i>
Individual Level								
Years in the military	10.16 (7.34)	<b>0.55</b>	<b>0.38–0.78</b>	<b>1.83</b>	7.02 (5.78)	0.55	0.22–1.33	1.83
Personal coping	3.65 (0.69)	<b>0.62</b>	<b>0.48–0.81</b>	<b>1.61</b>	3.69 (0.65)	0.77	0.48–1.23	1.30
Alcohol problems	6.47 (7.71)	<b>1.51</b>	<b>1.21–1.88</b>	<b>1.51</b>	3.77 (4.45)	1.42	0.93–2.18	1.42
Financial stress	2.28 (1.13)	<b>1.33</b>	<b>1.05–1.69</b>	<b>1.33</b>	2.14 (1.11)	1.16	0.76–1.75	1.16
Depressive symptoms	2.41 (0.85)	1.33	0.93–1.89	1.33	2.36 (0.86)	1.09	0.63–1.88	1.09
Physical well being	3.57 (0.80)	0.79	0.61–1.03	1.26	3.63 (0.77)	1.05	0.66–1.66	1.05
Religious involvement	2.73 (1.10)	1.02	0.78–1.34	1.02	2.97 (1.06)	1.19	0.72–1.96	1.19
Family Level								
Length of marriage <sup>a</sup>	8.78 (6.96)	<b>0.37</b>	<b>0.19–0.73</b>	<b>2.70</b>	5.73 (5.85)	0.62	0.15–2.53	1.61
Number of children	0.76 (1.07)	<b>0.44</b>	<b>0.27–0.73</b>	<b>2.26</b>	0.64 (0.97)	0.86	0.47–1.57	1.16
Parent–child relationship satisfaction <sup>b</sup>	4.57 (1.11)	0.54	0.23–1.11	1.87	4.85 (0.96)	0.84	0.36–1.94	1.19
Family income (monthly \$)	7093 (1881)	<b>0.56</b>	<b>0.37–0.83</b>	<b>1.80</b>	7513 (2352)	0.84	0.49–1.46	1.19
Family coping <sup>c</sup>	4.27 (1.28)	<b>0.61</b>	<b>0.41–0.90</b>	<b>1.65</b>	4.76 (1.11)	0.82	0.44–1.50	1.22
Relationship satisfaction <sup>d</sup>	4.93 (1.62)	0.85	0.62–1.17	1.18	5.39 (1.47)	0.99	0.62–1.58	1.01
IPV victimization <sup>d</sup>	2.34 (7.08)	1.17	0.92–1.50	1.17	1.23 (4.71)	<b>1.69</b>	<b>1.14–2.52</b>	<b>1.69</b>
Workplace Level								
Workgroup cohesion	3.49 (1.25)	<b>0.72</b>	<b>0.53–0.97</b>	<b>1.39</b>	3.49 (1.24)	1.07	0.66–1.73	1.07
Support from leadership	3.55 (1.11)	<b>0.75</b>	<b>0.57–0.98</b>	<b>1.34</b>	3.64 (1.07)	1.09	0.69–1.71	1.09
Workplace relationship satisfaction	3.44 (1.01)	0.82	0.64–1.04	1.22	3.43 (1.01)	1.02	0.65–1.62	1.02
Satisfaction with the AF	3.39 (1.28)	0.83	0.62–1.12	1.20	3.69 (1.31)	0.73	0.42–1.26	1.37
Community Level								
Social support	3.60 (1.55)	<b>0.54</b>	<b>0.41–0.72</b>	<b>1.85</b>	3.81 (1.57)	0.81	0.51–1.27	1.24
Community unity	3.54 (1.04)	<b>0.69</b>	<b>0.52–0.91</b>	<b>1.45</b>	3.78 (0.95)	0.88	0.53–1.46	1.13
Support from formal agencies	3.90 (1.23)	<b>0.70</b>	<b>0.54–0.91</b>	<b>1.44</b>	4.18 (1.15)	0.80	0.51–1.25	1.25
Community resources	3.36 (1.06)	<b>0.73</b>	<b>0.54–0.97</b>	<b>1.37</b>	3.22 (0.96)	0.67	0.39–1.14	1.50
Community safety	4.73 (1.01)	0.88	0.72–1.08	1.14	4.85 (0.88)	0.74	0.49–1.11	1.36

*Note.* OR = odds ratio, the natural exponentiation of the logistic regression coefficient ( $e^b$ ).  $|OR|$  = the natural exponentiation of the absolute value of the logistic regression coefficient ( $e^{|b|}$ ). All results were computed using the development subsamples only. **Bold text**



indicates a significant odds ratio ( $p < .05$ ). Weighted  $n = 711$  men and 277 women unless otherwise indicated. <sup>a</sup> $n = 350$  men and 110 women. <sup>b</sup> $n = 254$  men and 96 women. <sup>c</sup> $n = 376$  men and 150 women. <sup>d</sup> $n = 483$  men and 189 women.

Table 10

*Final Multivariate Regression Models Predicting Suicidal Behavior Among Men Reporting Suicidal Ideation*

Variable	OR	95% CI	OR
Overall			
Number of children <sup>a</sup>	0.55	0.39–0.78	1.81
Social support	0.63	0.49–0.79	1.60
Alcohol problems	1.28	1.09–1.51	1.28
Overall (men with wives and/or children only)			
Number of children <sup>a</sup>	0.56	0.36–0.88	1.79
Family coping	0.72	0.56–0.91	1.39
Alcohol problems	1.25	1.00–1.54	1.25
Individual Level			
Years in the military	0.66	0.47–0.94	1.51
Personal coping	0.76	0.64–0.92	1.31
Alcohol problems	1.25	1.08–1.46	1.25
Family Level			
Number of children <sup>a</sup>	0.51	0.36–0.73	1.94
Family Level (men with wives and/or children only)			
Number of children <sup>a</sup>	0.52	0.33–0.84	1.91
Family coping	0.68	0.54–0.86	1.47
Family Level (married men only)			
Length of marriage	0.33	0.14–0.75	3.06
Family coping	0.67	0.53–0.86	1.49
Workplace Level			
—			
Community Level			
Social support	0.61	0.48–0.77	1.64

<sup>a</sup>Number of children is not a significant predictor if analyses are restricted to fathers only; therefore, it is parental status (with versus without children) — rather than number of children per se — that appears to matter.

### Partner Physical Assault

Descriptive statistics and bivariate correlations are presented in Table 11. As hypothesized, nearly all of the study variables were significantly related to partner aggression for men. The associations between partner aggression and the more proximal levels (individual and family) tended to be larger in magnitude than the more distal levels (community and organization). For women, there were a smaller number of significant predictors of partner aggression, but those with the largest correlation coefficients also tended to individual and family level predictors. Only two organization variables and one community variable were significant predictors of women's partner aggression.

**Did risk and promotive factors from all four ecological levels uniquely predict partner physical assault?** Only bivariately, as workplace-level variables were not uniquely predictive in the context of variables from the other levels (see Tables 12 & 13). Specifically, relationship satisfaction, alcohol problems, financial stress, and number of years in the military were identified as unique predictors of active-duty men's and women's perpetration of violence against their partners in the overall models. Parental status, support from neighbors, personal coping, and support from formal agencies also uniquely predicted men's (but not women's) perpetration of violence across ecological levels. This study identified specific risk factors of partner violence that may be targeted by prevention and intervention efforts aimed at different levels of impact (e.g., family interventions, community-wide programs).

Table 11  
*Bivariate Correlations Among Predictor Variables and Partner Aggression*

	<u>Men</u>		<u>Women</u>	
	<i>r</i>	M (SD)	<i>r</i>	M (SD)
<u>Individual Level</u>				
Alcohol Problems	.18**	3.61(3.80)	.09**	2.50(2.73)
Years in Military	-.17**	10.93(7.17)	-.16**	7.46(6.04)
Financial Stress	.15**	1.84(0.88)	.15**	1.74(0.85)
Depressive Symptoms	.16**	1.50(0.60)	.10**	1.62(0.64)
Personal Coping	-.16**	4.18(0.48)	-.11**	4.04(0.51)
Physical Well-being	-.11**	4.13(0.71)	-.05	4.02(0.73)
Spirituality/Religiosity	-.10**	3.07(1.14)	-.00	3.14(1.06)
<u>Family Level</u>				
Relationship Satisfaction	-.21**	5.83(1.09)	-.18**	5.89(1.13)
Family Coping	-.17**	5.00(0.97)	-.18**	5.22(0.87)
Spouse Support for Deploy.	-.17**	3.13(0.80)	-.16**	3.14(0.90)
Support from Sign. Other	-.15**	4.90(1.03)	-.15**	5.23(0.93)
Parental Status	-.17**	62.1% <sup>a</sup>	-.07**	50.5% <sup>a</sup>
Marital Length	-.10**	8.42(6.82)	-.17**	5.54(5.66)

Family Income (US \$ monthly)	-.14**	6229.26(3300.52)	-.05	7337.59(4639.88)
Parent Child Relations	-.12**	5.08(0.72)	-.08	5.23(0.71)
Child Physical Aggression	.17**	1.08(1.21)	.05	1.20(1.35)

#### Organization Level

Satisfaction with Air Force	-.13**	4.17(1.08)	-.10**	4.27(1.15)
Workgroup Cohesion	-.10**	4.13(1.10)	-.01	3.93(1.14)
Work Relations	-.10**	3.94(0.85)	-.08*	3.76(0.92)
Weeks Deployed	-.00	8.18(11.13)	-.04	5.20(9.31)
Hours Worked	.05*	41.02(4.38)	.02	40.59(3.16)

#### Community Level

Community Unity	-.11**	4.09(0.83)	-.02	4.14(0.83)
Support from Neighbors	-.12**	4.55(1.02)	-.06	4.40(1.06)
Support for Youth	-.08**	4.31(0.97)	-.02	4.38(0.95)
Support from Formal agencies	-	4.38(0.93)		4.54(0.91)
	.05*		.01	
Social Support	-.07**	4.25(1.38)	-.03	4.22(1.48)
Support from Leadership	-.08**	4.11(0.88)	-.02	4.09(0.88)
Community Safety	-.08**	5.02(0.76)	-.06**	4.97(0.80)
Community Stress	.09**	4.11 (0.91)	.06	4.13(0.91)

*Note.*  $r$  = Correlation Coefficient.  $M (SD)$  = Means (Standard deviations). Means and standard deviations are presented for the whole sample.  $N=34713$  men and  $N=8031$  women for all variables except those that were only answerable by married individuals (marital length and spouse deployment support:  $n = 29992$  men and  $n = 5861$  women), married individuals or parents (family coping:  $n = 30567$  men and  $n = 6394$  women), or parents (child physical aggression and parent child relations ( $n = 22446$  men and  $n = 4073$  women).} Correlation coefficients are presented for the development subsample { $n = 5,397$  men and  $n = 1,866$  women for all variables except those that were only answerable by married individuals (marital length and spouse deployment support:  $n = 4,578$  men and  $n = 1,378$  women), married individuals or parents (family coping:  $n = 4,665$  men and  $n = 1,493$  women), or parents (child physical aggression and parent child relations ( $n = 3,353$  men and  $n = 943$  women).}

<sup>a</sup>Represents the percentage of men and women with minor children living with them in the sample.

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 12  
*Stepwise Regression Analyses of Men's Partner Aggression*

	Development Sample ( <i>n</i> = 5,397)			Validation Sample ( <i>n</i> = 5,640)		
	<i>b</i>	<i>SE</i>	<i>t</i>	<i>b</i>	<i>SE</i>	<i>t</i>
<u>Overall in a Relationship</u>						
Relationship Satisfaction	-0.27	0.03	-9.38***	-0.27	-0.02	-11.01***
Alcohol Problems	0.16	0.03	5.86***	0.11	0.02	4.83***
Financial Stress	0.13	0.02	5.39***	0.11	0.03	3.53***
Parental Status	-0.41	0.06	-7.20***	-0.30	0.05	-5.61***
Military Years	-0.12	0.03	-4.18***	-0.16	0.02	-6.40***
Community Unity	-0.09	0.03	-3.04**	-0.04	0.03	-1.53
Support from Neighbors	-0.06	0.03	-2.33*	-0.05	0.02	-2.22*
Personal Coping	-0.08	0.03	-2.66**	-0.09	0.02	-3.86***
Support from Formal Agencies	-0.08	0.03	2.95**	-0.06	0.03	-2.13*
<u>Individual Level</u>						
Depressive Symptoms	0.09	0.04	2.49*	0.11	0.03	4.34***
Alcohol Problems	0.19	0.03	6.86***	0.14	0.02	6.47***
Years in Military	-0.16	0.03	-6.05***	-0.18	0.02	-7.48***
Financial Stress	0.13	0.02	5.41***	0.11	0.03	3.46***
Personal Coping	-0.13	0.03	-4.15***	-0.13	0.02	-5.28***
Spirituality/Religiosity	-0.07	0.03	-2.65*	-0.00	0.03	-0.10
<u>Family Level</u>						
Parental Status	-0.51	0.05	-9.66***	-0.38	0.05	-7.71***
Family Income	-0.17	0.03	-5.98***	-0.19	0.03	-7.32***
Relationship Satisfaction	-0.32	0.03	-12.20***	-0.31	0.03	-11.48***
Support from Sign. Other	-0.08	0.02	-3.48***	-0.04	0.03	-1.68
<u>Organization Level</u>						
Satisfaction with AF	-0.17	0.03	-5.79***	-0.13	0.02	-5.26***
Work Relations	-0.08	0.03	-2.82**	-0.08	0.03	-2.69**
Work Group Cohesion	-0.07	0.03	-2.35*	-0.03	0.03	-0.81
Hours Worked	0.07	0.02	2.78**	-0.00	0.02	-0.03
<u>Community Level</u>						

Community Safety	-0.06	0.03	-2.11*	-0.06	0.02	-2.50*
Community Unity	-0.14	0.03	-4.52***	-0.07	0.03	-2.33*
Support from Formal Agencies	-0.06	0.03	-2.19*	-0.02	0.03	-0.64
Support from Neighbors	-0.13	0.03	-4.96***	-0.12	0.03	-4.57***

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\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 13  
*Stepwise Regression Analyses of Women's Partner Aggression*

	<u>Development Sample (n = 1,866)</u>			<u>Validation Sample (n = 1,902)</u>		
	<i>b</i>	<i>SE</i>	<i>t</i>	<i>b</i>	<i>SE</i>	<i>t</i>
<u>Overall in a Relationship</u>						
Relationship Satisfaction	-0.22	0.05	-4.65***	-0.24	0.05	-4.97***
Alcohol Problems	0.10	0.05	2.16*	0.17	0.05	3.86***
Financial Stress	0.13	0.04	2.93**	0.25	0.04	5.85***
Military Years	-0.28	0.05	-5.44***	-0.18	0.06	-3.25**
Support from Sign. Other	-0.12	0.05	-2.35*	-0.09	0.05	-1.71
<u>Individual Level</u>						
Alcohol Problems	0.12	0.05	2.53*	0.18	0.05	3.89***
Military Years	-0.25	0.05	-4.90***	-0.14	0.05	-2.53*
Financial Stress	0.18	0.04	4.25***	0.26	0.04	5.93***
Personal Coping	-0.11	0.04	-2.75**	-0.20	0.04	-5.01***
<u>Family Level</u>						
Parental Status	-0.29	0.09	-3.21**	-0.23	0.09	-2.50*
Relationship Satisfaction	-0.24	0.05	-5.34***	-0.28	0.05	-6.08***
Support from Sign. Other	-0.17	0.05	-3.45***	-0.13	0.05	-2.43*
<u>Organization Level</u>						
Satisfaction with Air Force	-0.16	0.04	-3.69***	-0.16	0.04	-3.78***
Work Relations	-0.14	0.05	-2.88**	-0.10	0.05	-2.27**
Workgroup Cohesion	-0.11	0.06	-2.02*	-0.03	0.05	-0.73
<u>Community Level</u>						
Community Safety	-0.10	0.04	-2.60*	-0.03	0.05	-0.57

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

### Partner Physical Abuse

Descriptive statistics, bivariate logistic regression coefficients predicting partner physical abuse, and concomitant odds ratios (OR) are presented in Table 14. For men, nearly all of the hypothesized partner physical abuse predictors were significant; the strongest predictors were individual and family variables. For example, for every standard deviation increase in men's child-directed physical aggression or alcohol problems, there was approximately a twofold increase in odds of partner physical abuse (ORs = 2.08 and 1.73, respectively). For every standard deviation decrease in men's relationship satisfaction or their wives' ability to cope with deployment, partner physical abuse was cut in half (ORs = .54 and .58, respectively). For women, half the individual and family variables (and none of the community or workplace variables) predicted partner physical abuse. Marital length was the strongest predictor of women's partner physical abuse. For one standard deviation increase in marital length, the odds of partner physical abuse perpetration were cut by more than half (OR = .42).

**Did risk and promotive factors from all four ecological levels uniquely predict partner physical abuse?** No (see Table 15). Hypothesized factors from all four ecological levels were related to men's partner physical abuse perpetration bivariate, but only individual and family factors accounted for unique variance across ecological levels. For women, only risk factors from the individual and family levels were significantly related to partner physical abuse perpetration even bivariate. Results imply somewhat different risk profiles across gender and identify risk and promotive factors (i.e., workplace- and community-level predictors) of men's partner physical abuse not previously studied.

Table 14

*Bivariate Odds Ratios among Predictor Variables and Partner Physical Abuse*

	Men			Women		
	<i>B</i>	<i>e<sup>B</sup></i>	<i>M (SD)</i>	<i>B</i>	<i>e<sup>B</sup></i>	<i>M (SD)</i>
<i>Individual Level</i>						
Alcohol problems	0.55	1.73***	3.61(3.80)	0.23	1.26	2.50(2.73)
Years in military	-0.44	0.64***	10.93(7.17)	-0.47	0.63*	7.46(6.04)
Financial stress	0.42	1.53***	1.84(0.88)	0.41	1.50**	1.74(0.85)
Depressive symptoms	0.47	1.60***	1.50(0.60)	0.19	1.21	1.62(0.64)
Personal coping	-0.52	0.60***	4.18(0.48)	-0.41	0.66**	4.04(0.51)
Physical well-being	-0.25	0.78**	4.13(0.71)	-0.16	0.85	4.02(0.73)
Spirituality/religiosity	-0.26	0.77*	3.07(1.14)	-0.01	0.99	3.14(1.06)
<i>Family Level</i>						
Relationship satisfaction	-0.61	0.54***	5.83(1.09)	-0.55	0.58***	5.89(1.13)
Parental status	-0.93	0.39***	57.1% <sup>a</sup>	-0.16	0.85	47.9% <sup>a</sup>
Support significant other	-0.31	0.74***	4.90(1.03)	-0.54	0.58**	5.23(0.93)
Family income (USD/mo.)	-0.48	0.62***	6229(3301)	-0.34	0.71*	7338(4640)
Marital length	-0.48	0.62***	8.42(6.82)	-0.87	0.42*	5.54(5.66)
Spouse support for deployment	-0.55	0.58***	3.13(0.80)	-0.19	0.83	3.14(0.90)
Family coping	-0.48	0.62***	5.00(0.97)	-0.50	0.61**	5.22(0.87)
Parent child relations	-0.34	0.71*	5.08(0.72)	-0.31	0.74	5.23(0.71)
Child physical aggression	0.73	2.08***	1.08(1.21)	0.22	1.25	1.20(1.35)



*Organization Level*

Satisfaction with Air Force	-0.33	0.72***	4.17(1.08)	-0.20	0.82	4.27(1.15)
Unit readiness	-0.33	0.72***	4.13(1.10)	0.03	1.03	3.93(1.14)
Work relations	-0.26	0.77**	3.94(0.85)	0.06	1.06	3.76(0.92)
Weeks deployed	0.01	1.01	8.18(11.13)	-0.49	0.61	5.20(9.31)
Hours worked	0.06	1.06	41.02(4.38)	-0.39	0.67	40.59(3.16)
Support from leadership	-0.23	0.79**	4.11(0.88)	0.03	1.03	4.09(0.88)

*Community Level*

Community unity	-0.27	0.76**	4.09(0.83)	0.09	1.09	4.14(0.83)
Support from neighbors	-0.35	0.71***	4.55(1.02)	-0.19	0.83	4.40(1.06)
Support for youth	-0.17	0.84	4.31(0.97)	-0.25	0.78	4.38(0.95)
Support from formal agencies	-0.19	0.82*	4.38(0.93)	0.08	1.08	4.54(0.91)
Social support	-0.40	0.67***	4.25(1.38)	-0.19	0.83	4.22(1.48)
Community safety	-0.10	0.91	5.02(0.76)	-0.27	0.77	4.97(0.80)
Community stress	0.18	1.20*	4.11(0.91)	0.00	1.00	4.13(0.91)

Note:  $e^B$  = exponentiated  $B$ . Results are presented for the development subsample;  $n = 858$  men and  $n = 257$  women for all variables except those that were only answerable by married individuals (marital length and spouse deployment support:  $n = 684$  men and  $n = 177$  women), married individuals or parents (family coping:  $n = 709$  men and  $n = 195$  women), or parents (child physical aggression and parent child relations;  $n = 490$  men and  $n = 123$  women).

<sup>a</sup>Percentage with minor children in the home.

\* $p < .05$ . \*\* $p < .01$ . \*\*\* $p < .001$

Table 15

*Stepwise Regression Analyses Predicting Partner Physical Abuse*

	Development Sample ( $n = 858$ )			Validation Sample ( $n = 860$ )		
	$B$	$SE\ B$	$Wald$	$B$	$SE\ B$	$Wald$
<i>Men</i>						
<i>Within Ecological Levels</i>						
<i>Individual Level</i>						
Depressive symptoms	0.22	0.11	4.17*	0.23	0.09	6.20*
Alcohol problems	0.46	0.08	34.90***	0.29	0.07	16.40***
Financial stress	0.27	0.09	9.68**	0.26	0.08	10.59**
Personal coping	-0.26	0.10	6.60*	-0.20	0.12	2.72
<i>Family Level</i>						
Parental status	-0.89	0.21	17.20***	-0.55	0.22	6.43*
Family income	-0.38	0.12	10.86***	-0.55	0.13	19.28***
Relationship satisfaction	-0.69	0.09	53.25***	-0.51	0.08	44.48***
<i>Organization Level</i>						
Satisfaction with Air Force	-0.29	0.07	17.42***	-0.42	0.09	22.68***
Unit readiness	-0.26	0.08	10.66**	0.04	0.10	0.12
<i>Community Level</i>						

Social support	-0.36	0.09	15.02 <sup>***</sup>	-0.07	0.09	0.71
Community unity	-0.21	0.10	4.31 <sup>*</sup>	-0.26	0.09	7.82 <sup>**</sup>
<i>Overall (Across Ecological Levels)</i>						
Relationship satisfaction	-0.54	0.10	27.44 <sup>***</sup>	-0.44	0.08	2.03 <sup>***</sup>
Alcohol problems	0.40	0.09	22.09 <sup>***</sup>	0.25	0.08	9.50 <sup>**</sup>
Financial stress	0.34	0.09	14.39 <sup>***</sup>	0.34	0.08	16.00 <sup>***</sup>
Social support	-0.33	0.11	9.30 <sup>**</sup>	-0.02	0.09	0.06
Parental status	-0.90	0.22	16.27 <sup>***</sup>	-0.77	0.22	12.67 <sup>***</sup>
<i>Women</i>						
<i>Within Ecological Levels</i>						
<i>Individual Level</i>						
Financial stress	0.34	0.15	5.40 <sup>*</sup>	0.35	0.13	7.93 <sup>**</sup>
Personal coping	-0.35	0.15	5.39 <sup>*</sup>	-0.26	0.12	4.88 <sup>*</sup>
<i>Family Level</i>						
Family income	-0.36	0.14	6.49 <sup>*</sup>	-0.44	0.15	8.43 <sup>**</sup>
Relationship satisfaction	-0.56	0.12	1.61 <sup>***</sup>	-0.39	0.15	6.62 <sup>*</sup>
<i>Organization Level</i>						
None are significant						
<i>Community Level</i>						
None are significant						
<i>Overall (Across Ecological Levels)</i>						
Relationship satisfaction	-0.62	0.15	4.18 <sup>***</sup>	-0.38	0.15	2.57 <sup>*</sup>
Family income	-0.45	0.17	-2.67 <sup>**</sup>	-0.44	0.15	-2.92 <sup>**</sup>

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\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

### *Partner Emotional Abuse*

Bivariate odds ratios are presented in Table 16. To aid in comparing the effects of risk versus promotive factors, we also present “absolute” odds ratios, which are the increases in odds of emotional abuse victimization given a one-standard-deviation shift in a direction that increases risk (i.e., higher for risk factors, lower for promotive factors).

**Did risk and promotive factors from all four ecological levels uniquely predict partner emotional abuse?** Only bivariately. Almost all hypothesized factors from all four ecological levels were bivariately related to both men’s and women’s partner emotional abuse victimization bivariately (see Table 16), but other than social support for fathers, only individual and family factors accounted for unique variance across ecological levels (see Tables 17 & 18). Results imply that workplace- and community-level risk and promotive factors — though not previously studied in the context of partner emotional abuse — are important and may relate to partner emotional abuse victimization largely via effects on individual- and family-level functioning (see structural equation modeling results below).

Table 16. *Bivariate Odds Ratios and 95% Confidence Intervals for Potential Risk/Protective Factors Predicting Emotional Abuse Victimization*

	Men			Women		
	<i>OR</i>	<i>95% CI</i>	<i> OR </i>	<i>OR</i>	<i>CI</i>	<i> OR </i>
Individual Level						
Depressive symptoms	<b>2.14</b>	<b>2.00-2.29</b>	<b>2.14</b>	<b>1.89</b>	<b>1.69-2.12</b>	<b>1.89</b>
Personal coping	<b>0.61</b>	<b>0.57-0.65</b>	<b>1.64</b>	<b>0.67</b>	<b>0.61-0.75</b>	<b>1.49</b>
Financial stress	<b>1.58</b>	<b>1.49-1.67</b>	<b>1.58</b>	<b>1.37</b>	<b>1.21-1.56</b>	<b>1.37</b>
Physical well being	<b>0.65</b>	<b>0.60-0.69</b>	<b>1.54</b>	<b>0.70</b>	<b>0.63-0.79</b>	<b>1.43</b>
Alcohol problems	<b>0.84</b>	<b>0.77-0.92</b>	<b>1.19</b>	0.87	0.73-1.02	1.15
Years in the military	<b>0.84</b>	<b>0.77-0.92</b>	<b>1.19</b>	0.87	0.73-1.02	1.15
Religious involvement	<b>0.86</b>	<b>0.80-0.91</b>	<b>1.16</b>	<b>0.85</b>	<b>0.75-0.96</b>	<b>1.18</b>
Family Level						
Relationship satisfaction	<b>0.39</b>	<b>0.36-0.42</b>	<b>2.56</b>	<b>0.41</b>	<b>0.35-0.47</b>	<b>2.44</b>
Parent-child relationship satisfaction <sup>a</sup>	<b>0.63</b>	<b>0.57-0.70</b>	<b>1.59</b>	<b>0.71</b>	<b>0.60-0.85</b>	<b>1.41</b>
Career support from partner	<b>0.64</b>	<b>0.60-0.68</b>	<b>1.56</b>	<b>0.62</b>	<b>0.55-0.69</b>	<b>1.61</b>
Spouse preparedness for deployment <sup>b</sup>	<b>0.64</b>	<b>0.59-0.69</b>	<b>1.56</b>	<b>0.65</b>	<b>0.58-0.73</b>	<b>1.54</b>
Family coping <sup>c</sup>	<b>0.79</b>	<b>0.74-0.84</b>	<b>1.27</b>	<b>0.69</b>	<b>0.57-0.84</b>	<b>1.45</b>
Child physical assault <sup>a</sup>	<b>1.23</b>	<b>1.13-1.34</b>	<b>1.23</b>	<b>1.28</b>	<b>1.08-1.52</b>	<b>1.28</b>
Length of marriage <sup>b</sup>	<b>0.82</b>	<b>0.74-0.91</b>	<b>1.22</b>	0.81	0.65-1.01	1.23
Family income (monthly \$)	<b>0.86</b>	<b>0.78-0.95</b>	<b>1.16</b>	1.04	0.94-1.16	1.04
Number of children	1.01	0.93-1.09	1.01	<b>1.23</b>	<b>1.08-1.39</b>	<b>1.23</b>
Workplace Level						
Satisfaction with the AF	<b>0.71</b>	<b>0.66-0.77</b>	<b>1.41</b>	<b>0.76</b>	<b>0.68-0.85</b>	<b>1.32</b>
Support from leadership	<b>0.74</b>	<b>0.70-0.78</b>	<b>1.35</b>	<b>0.77</b>	<b>0.69-0.86</b>	<b>1.30</b>
Work relationship satisfaction	<b>0.74</b>	<b>0.69-0.80</b>	<b>1.35</b>	<b>0.89</b>	<b>0.79-1.01</b>	<b>1.12</b>
Workgroup cohesion	<b>0.76</b>	<b>0.71-0.81</b>	<b>1.32</b>	<b>0.82</b>	<b>0.72-0.94</b>	<b>1.22</b>
Weekly hours worked	<b>1.11</b>	<b>1.05-1.18</b>	<b>1.11</b>	<b>1.21</b>	<b>1.08-1.36</b>	<b>1.21</b>
Weeks deployed in past year	0.97	0.90-1.04	1.03	0.98	0.84-1.14	1.02
Community Level						
Community unity	<b>0.72</b>	<b>0.68-0.76</b>	<b>1.39</b>	<b>0.82</b>	<b>0.72-0.93</b>	<b>1.22</b>
Support from formal agencies	<b>0.76</b>	<b>0.71-0.82</b>	<b>1.32</b>	<b>0.82</b>	<b>0.73-0.92</b>	<b>1.22</b>
Support from neighbors	<b>0.76</b>	<b>0.71-0.80</b>	<b>1.32</b>	<b>0.85</b>	<b>0.76-0.94</b>	<b>1.18</b>
Community resources	<b>0.76</b>	<b>0.71-0.81</b>	<b>1.32</b>	<b>0.86</b>	<b>0.76-0.98</b>	<b>1.16</b>
Social support	<b>0.78</b>	<b>0.73-0.83</b>	<b>1.28</b>	<b>0.87</b>	<b>0.78-0.98</b>	<b>1.15</b>
Support for youth	<b>0.79</b>	<b>0.74-0.86</b>	<b>1.27</b>	<b>0.82</b>	<b>0.73-0.92</b>	<b>1.22</b>
Community safety	<b>0.81</b>	<b>0.76-0.86</b>	<b>1.23</b>	<b>0.88</b>	<b>0.79-0.98</b>	<b>1.14</b>

*Note.* OR = odds ratio, the natural exponentiation of the logistic regression coefficient ( $e^b$ ).  $|OR|$  = the natural exponentiation of the absolute value of the logistic regression coefficient ( $e^{|b|}$ ). All results were computed using the development subsamples only. **Bold text** indicates a significant odds ratio ( $p < .05$ ). Weighted  $n = 17,247$  men and 4,016 women unless otherwise indicated. <sup>a</sup> $n = 11,083$  men and 2,028 women. <sup>b</sup> $n = 14,909$  men and 2,937 women. <sup>c</sup> $n = 15,194$  men and 3,197 women).

Table 17

*Final Multivariate Regression Models Predicting Men's Emotional Abuse Victimization*

Variable	OR	95% CI	OR
Overall			
Relationship satisfaction	0.45	0.42–0.49	2.23
Depressive symptoms	1.73	1.60–1.87	1.73
Financial stress	1.21	1.12–1.31	1.21
Personal coping	0.91	0.85–0.99	1.09
Overall – Married			
Relationship satisfaction	0.44	0.40–0.47	2.29
Depressive symptoms	1.79	1.65–1.93	1.79
Financial stress	1.19	1.10–1.28	1.19
Spouse preparedness for deployment	0.86	0.80–0.93	1.16
Length of marriage	0.89	0.79–1.00	1.13
Overall – Fathers			
Relationship satisfaction	0.44	0.40–0.49	2.27
Depressive symptoms	1.72	1.56–1.89	1.72
Financial stress	1.13	1.02–1.24	1.13
Personal coping	0.87	0.79–0.96	1.15
Social support	0.89	0.80–0.98	1.13
Child physical assault	1.15	1.04–1.27	1.15
Overall – Married Fathers			
Relationship satisfaction	0.44	0.40–0.49	2.27
Depressive symptoms	1.73	1.57–1.91	1.73
Personal coping	0.89	0.80–0.98	1.13
Social support	0.87	0.79–0.96	1.15
Child physical assault	1.13	1.02–1.24	1.13
Spouse preparedness for deployment	0.84	0.74–0.94	1.20
Individual Level			
Depressive symptoms	1.84	1.70–1.99	1.84
Financial stress	1.27	1.20–1.35	1.27
Personal coping	0.82	0.76–0.89	1.22
Alcohol problems	1.12	1.05–1.18	1.12
Family Level			
Relationship satisfaction	0.41	0.39–0.44	2.44
Career support from partner	0.87	0.82–0.92	1.15
Family income (monthly \$)	0.87	0.77–0.98	1.15
Family Level – Married			
Relationship satisfaction	0.41	0.38–0.45	2.41
Spouse preparedness for deployment	0.76	0.71–0.83	1.31
Length of marriage	0.85	0.77–0.94	1.17
Family coping	0.90	0.84–0.98	1.11
Family Level – Fathers			
Relationship satisfaction	0.41	0.37–0.45	2.44

Child physical assault	1.17	1.06–1.29	1.17
Parent–child relationship satisfaction	0.86	0.78–0.95	1.16
Career support from partner	0.87	0.79–0.96	1.15
Family Level – Married Fathers			
Relationship satisfaction	0.39	0.35–0.43	2.56
Spouse preparedness for deployment	0.76	0.67–0.85	1.32
Child physical assault	1.15	1.04–1.27	1.15
Parent–child relationship satisfaction	0.88	0.80–0.97	1.14
Workplace Level			
Satisfaction with the AF	0.79	0.73–0.86	1.26
Workplace relationship satisfaction	0.85	0.79–0.92	1.17
Support from leadership	0.86	0.80–0.93	1.16
Weekly hours worked	1.11	1.04–1.17	1.11
Community Level			
Community unity	0.80	0.74–0.87	1.25
Community safety	0.90	0.85–0.96	1.11
Support from neighbors	0.90	0.84–0.98	1.11
Social support	0.90	0.84–0.98	1.11

*Note.* OR = odds ratio, the natural exponentiation of the logistic regression coefficient ( $e^b$ ). |OR| = the natural exponentiation of the absolute value of the logistic regression coefficient ( $e^{|b|}$ ).

Table 18

*Final Multivariate Regression Models Predicting Women's Emotional Abuse Victimization*

Variable	OR	95% CI	OR
Overall			
Relationship satisfaction	0.44	0.38–0.52	2.25
Depressive symptoms	1.65	1.44–1.89	1.65
Number of children	1.25	1.09–1.43	1.25
Alcohol problems	1.19	1.01–1.39	1.19
Overall – Married			
Relationship satisfaction	0.50	0.41–0.60	2.01
Depressive symptoms	1.58	1.35–1.85	1.58
Alcohol problems	1.21	1.01–1.44	1.21
Family coping	0.84	0.71–0.98	1.20
Spouse preparedness for deployment	0.84	0.74–0.97	1.19
Individual Level			
Depressive symptoms	1.68	1.50–1.89	1.68
Alcohol problems	1.21	1.05–1.39	1.21
Personal coping	0.86	0.77–0.97	1.16
Financial stress	1.15	1.00–1.32	1.15
Family Level			
Relationship satisfaction	0.43	0.37–0.50	2.32
Career support from partner	0.84	0.74–0.94	1.20
Number of children	1.16	1.01–1.33	1.16
Family Level – Married			
Relationship satisfaction	0.48	0.39–0.58	2.10
Family coping	0.79	0.68–0.93	1.26
Spouse preparedness for deployment	0.81	0.71–0.93	1.23
Family Level – Mothers			
Relationship satisfaction	0.55	0.44–0.68	1.82
Family coping	0.79	0.65–0.96	1.27
Career support from partner	0.79	0.67–0.95	1.26
Child physical assault	1.23	1.01–1.5	1.23
Workplace Level			
Satisfaction with the AF	0.82	0.73–0.92	1.22
Weekly hours worked	1.21	1.08–1.36	1.21
Support from leadership	0.83	0.74–0.93	1.21
Community Level			
Support from formal agencies	0.84	0.75–0.95	1.19
Support from neighbors	0.88	0.78–0.99	1.14

Note. OR = odds ratio, the natural exponentiation of the logistic regression coefficient ( $e^b$ ). |OR| = the natural exponentiation of the absolute value of the logistic regression coefficient ( $e^{|b|}$ ).

### *Child Physical Assault and Abuse*

Because over 90% of parents in the sample were married, all child physical maltreatment models were first developed using married parents only, then cross-validated to single parents (all models cross-validated). Descriptive statistics and bivariate relations are presented in Table 19. To aid in comparing the effects of risk versus promotive factors for child physical abuse, we also present “absolute” odds ratios, which are the increases in odds given a one-standard-deviation shift in a direction that increases risk (i.e., higher for risk factors, lower for promotive factors). Most of the study variables from all four ecological levels were significantly related to fathers’ child physical assault, whereas significant predictors of (a) mothers’ child physical assault as well as (b) both genders’ child physical abuse were almost all individual- or family-level variables. Some of the gender differences in significant findings may be attributable to the much greater power that was present for analyses of fathers’ data; however, risk associations between child physical assault and several predictor variables (i.e., fewer years of military service, lower family income, IPV victimization, and shorter length of marriage) were significantly stronger for fathers than mothers (Fisher’s  $z' \geq 1.96$ ; see Table 19). Similarly, several variables were significantly associated with only fathers’, but not mothers’, child physical abuse. However, these gender differences in the physical abuse results seemed largely due to discrepancies in statistical power, as (a) overall patterns of prediction were similar across parent gender, and (b) no associations were stronger for fathers than mothers or vice versa (all  $z < 1.96$ ).

**Did risk and promotive factors from all four ecological levels uniquely predict child physical assault?** No (see Table 20). For fathers, seven of the eight family variables, three of the five individual variables, and a single workplace factor (weekly hours worked, which was weakly and negatively related) were retained in the overall model. No community variables contributed uniquely in the context of variables from the other levels of influence. The final overall model for mothers contained only number of children, years in the military, parent-child relationship satisfaction, and alcohol problems. These results imply that younger parents with greater numbers of minor children in the home tend to engage in a greater variety of physically aggressive acts against their children, as do parents who are functioning more poorly as individuals and families.

**Did risk and promotive factors from all four ecological levels uniquely predict child physical abuse?** No (see Table 21). Number of children, parent-child relationship satisfaction, religious involvement, alcohol problems, weekly hours worked (which was, again, a promotive factor — most likely because fathers who work more do less parenting), depressive symptoms, and the partner assault variables were retained in the overall model as significant unique predictors of fathers’ child physical abuse. The final overall model for mothers’ child physical abuse included only number of children and depressive symptoms. The variables in the final models for child physical abuse were, for the most part, also the strongest predictors in the final child physical assault models, suggesting — unsurprisingly — that physical assault variety scores and risk for child injury are linked. It should also be noted that higher religious involvement was a significant risk factor for fathers’ child physical abuse, but this was not due to an increase in variety of assaultive acts among religious fathers ( $r = .00$ ; see also structural equation modeling results below).



Table 19

*Bivariate Relations for Potential Risk/Promotive Factors Predicting Married Active-Duty Parents' Child Physical Assault and Abuse*

Variable	Child Physical Assault						Child Physical Abuse				
	Fathers			Mothers			Fathers		Mothers		<i>z</i>
	<i>M</i>	( <i>SD</i> )	<i>r</i>	<i>M</i>	( <i>SD</i> )	<i>r</i>	<i>z'</i>	<i>OR</i>	95% <i>CI</i>	<i>OR</i>	
Individual Variables											
Alcohol problems	0.42 (1.65)	.09***	0.19 (0.77)	.09*	0.17	<b>1.12</b>	<b>1.05–1.18</b>	1.25	0.95–1.63	-.80	
Financial stress	1.81 (0.88)	.10***	1.66 (0.86)	.08**	-0.13	<b>1.11</b>	<b>1.04–1.19</b>	1.18	0.94–1.49	-.53	
Depressive symptoms	1.44 (0.58)	.10***	1.56 (0.63)	.09**	-0.15	<b>1.16</b>	<b>1.09–1.23</b>	<b>1.30</b>	<b>1.03–1.65</b>	-.95	
Personal coping	4.22 (0.46)	-.09***	4.11 (0.51)	-.10**	0.39	<b>0.88</b>	<b>0.82–0.94</b>	0.85	0.66–1.10	.20	
Physical well being	4.12 (0.7)	-.06***	3.99 (0.73)	-.07*		<b>0.93</b>	<b>0.87–1.00</b>	0.88	0.71–1.10	.45	
Religious involvement	3.25 (1.09)	.00	3.30 (1.01)	-.04	-1.36	<b>1.18</b>	<b>1.11–1.27</b>	1.23	0.97–1.56	-.29	
Years of military service	13.65 (6.29)	-.17***	11.06 (5.88)	-.09**	2.81**	0.93	0.86–1.00	1.12	0.87–1.44	-1.40	
Family Variables											
Number of children	1.95 (0.87)	.19***	1.74 (0.81)	.17***	-0.75	<b>1.63</b>	<b>1.49–1.79</b>	<b>1.52</b>	<b>1.20–1.93</b>	.52	
Family income (monthly \$)	8105 (4709)	-.11***	6880 (3171)	-.02	2.69**	0.95	0.88–1.02	1.01	0.80–1.29	-.50	
Parent–child rel. satisfaction	5.10 (0.75)	-.15***	5.23 (0.75)	-.17***	-0.88	<b>0.74</b>	<b>0.70–0.80</b>	<b>0.73</b>	<b>0.58–0.92</b>	.12	
Family coping	5.82 (1.13)	-.11***	5.76 (1.27)	-.08**	1.03	<b>0.87</b>	<b>0.82–0.94</b>	0.87	0.68–1.10	.11	
Relationship satisfaction	4.95 (1.1)	-.09***	5.18 (0.9)	-.06	1.05	<b>0.93</b>	<b>0.88–0.99</b>	0.85	0.69–1.04	.90	
Partner assault perpetration	0.11 (1.11)	.11***	0.29 (2.4)	.09**	-0.66	<b>1.19</b>	<b>1.13–1.24</b>	1.10	0.96–1.27	1.00	
Partner assault victimization	0.37 (2.29)	.12***	0.26 (2.05)	.04	-2.42**	<b>1.18</b>	<b>1.12–1.25</b>	1.16	0.95–1.41	.20	
Length of marriage	10.02 (6.33)	-.13***	7.25 (5.52)	-.05	2.34**	0.97	0.90–1.04	1.02	0.81–1.28	-.41	
Career support from partner	4.97 (1.05)	-.06***	5.23 (0.94)	-.02	1.18	0.99	0.93–1.06	0.97	0.76–1.23	.21	
Spouse prep. for deployment	3.18 (0.77)	-.09***	3.06 (0.9)	-.06	1.03	<b>0.93</b>	<b>0.87–0.99</b>	1.01	0.82–1.25	-.76	
Workplace Variables											
Satisfaction with the AF	4.29 (0.96)	-.06***	4.54 (1.03)	-.04	0.51	0.98	0.91–1.04	1.03	0.82–1.30	-.48	
Support from leadership	4.11 (0.91)	-.06***	4.04 (0.95)	-.07	-0.10	0.95	0.89–1.01	0.92	0.73–1.16	.26	
Weekly hours worked	50.32 (12.96)	-.04***	46.45 (13.18)	-.02	0.55	<b>0.92</b>	<b>0.86–0.98</b>	0.99	0.77–1.26	-.53	
Weeks deployed in past year	7.96 (10.74)	-.01	4.16 (7.92)	.04	1.71	0.94	0.88–1.00	1.16	0.90–1.48	-1.59	
Workgroup cohesion	4.19 (1.08)	-.05***	3.90 (1.16)	-.04	0.38	0.98	0.92–1.06	1.04	0.83–1.31	-.48	
Workplace rel. satisfaction	3.99 (0.84)	-.05***	3.84 (0.89)	-.07*	-0.75	0.98	0.91–1.04	0.87	0.71–1.08	1.00	
Community Variables											

Community unity	4.09 (0.85)	-.05 ***	4.10 (0.87)	-.08 *	-0.92	0.97	0.91–1.03	0.95	0.76–1.18	.22
Support from neighbors	3.67 (1.03)	-.03 **	3.53 (1.11)	-.05	-0.39	0.95	0.88–1.03	1.03	0.84–1.26	-.66
Support for youth	4.29 (1.01)	-.02	4.29 (1.02)	-.05	-0.80	0.98	0.91–1.07	1.00	0.78–1.29	-.16
Formal agency support	4.38 (0.96)	-.03 **	4.52 (0.99)	-.04	-0.22	1.00	0.94–1.07	0.99	0.80–1.24	.08
Social support	4.31 (1.4)	.00	4.18 (1.5)	-.03	-1.00	1.02	0.95–1.10	0.89	0.72–1.11	1.19
Community safety	5.07 (0.73)	-.01	5.05 (0.76)	-.01	-0.18	0.99	0.93–1.06	0.99	0.79–1.23	.04
Community resources	4.09 (0.9)	-.03 **	4.10 (0.92)	-.05	0.87	0.98	0.90–1.05	0.96	0.77–1.20	.15

*Note.* Computed using married parents in development subsample only (weighted  $n = 11,259$  fathers and 1,195 mothers). All assault variables refer to physical assault. **Bold text** indicates a significant OR ( $p < .05$ ).

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 20

*Final Cross-Validated Multivariate Linear Regression Models Predicting Child Physical Assault Perpetrated by Married, Active-Duty Parents*

Model	Fathers <sup>a</sup>			Mothers <sup>b</sup>		
Variable	<i>b</i>	<i>SE b</i>	<i>B</i>	<i>b</i>	<i>SE b</i>	<i>B</i>
Overall						
Number of children	.22	.01	.20 ***	.20	.03	.18 ***
Years in the military	-.18	.01	-.16 ***	-.14	.02	-.12 ***
Parent-child relationship satisfaction	-.11	.01	-.10 ***	-.17	.02	-.16 ***
Partner aggression perpetration	.07	.01	.07 ***	—	—	—
Length of marriage	-.05	.01	-.05 ***	—	—	—
Depressive symptoms	.05	.01	.05 ***	—	—	—
Alcohol problems	.05	.01	.05 ***	.08	.03	.06 **
Family coping	-.04	.01	-.04 ***	—	—	—
Partner aggression victimization	.04	.01	.04 ***	—	—	—
Career support from spouse	.03	.01	.03 **	—	—	—
Weekly hours worked	-.02	.01	-.02 *	—	—	—
Individual Level						
Years in the military	-.17	.01	-.16 ***	-.07	.02	-.06 ***
Depressive symptoms	.06	.01	.07 ***	—	—	—
Alcohol problems	.06	.01	.06 ***	.07	.02	.04 *
Personal coping	-.04	.01	-.03 ***	-.09	.02	-.08 ***
Financial stress	.03	.01	.03 ***	—	—	—
Family Level						
Number of children in home	.22	.01	.20 ***	.18	.03	.16 ***
Length of marriage	-.14	.01	-.13 ***	—	—	—
Parent-child relationship satisfaction	-.11	.01	-.10 ***	-.16	.02	-.16 ***
Partner aggression perpetration	.07	.01	.07 ***	.04	.02	.06 **
Family income	-.06	.01	-.05 ***	—	—	—
Partner aggression victimization	.05	.01	.05 ***	—	—	—
Family coping	-.04	.01	-.04 ***	—	—	—
Spouse preparedness for deployment	-.02	.01	-.02 **	—	—	—
Organization Level						
Satisfaction with the Air Force	-.06	.01	-.06 ***	—	—	—
Workplace relationship satisfaction	—	—	—	-.05	.02	-.05 *
Support from leadership	-.04	.01	-.04 ***	—	—	—
Weekly hours worked	-.04	.01	-.04 ***	—	—	—
Community Level						
Community unity	-.06	.01	-.05 ***	-.07	.03	-.07 **

Note. <sup>a</sup>Total weighted *N* = 22,559. <sup>b</sup>Total weighted *N* = 2,389.

Table 21

*Final Cross-Validated Multivariate Logistic Regression Models Predicting Married Parents' Child Physical Abuse*

Variable	Fathers <sup>a</sup>			Mothers <sup>b</sup>		
	OR	OR	95% CI	OR	OR	95% CI
Overall						
Number of children in the home	1.54	1.54	1.43–1.65	1.54	1.54	1.33–1.77
Parent-child relationship satisfaction	0.81	1.23	0.77–0.86	–	–	–
Religious involvement	1.22	1.22	1.16–1.28	–	–	–
Alcohol problems	1.14	1.14	1.09–1.19	–	–	–
Weekly hours worked	0.89	1.12	0.85–0.94	–	–	–
Depressive symptoms	1.11	1.11	1.05–1.17	1.17	1.17	1.02–1.34
Partner aggression perpetration	1.11	1.11	1.06–1.17	–	–	–
Partner aggression victimization	1.07	1.07	1.01–1.12	–	–	–
Individual Level						
Religious involvement	1.26	1.26	1.20–1.32	–	–	–
Alcohol problems	1.14	1.14	1.09–1.19	–	–	–
Depressive symptoms	1.12	1.12	1.06–1.19	1.16	1.16	1.01–1.34
Personal coping	0.89	1.12	0.83–0.96	–	–	–
Family Level						
Number of children in the home	1.55	1.55	1.44–1.67	1.47	1.47	1.27–1.69
Parent-child relationship satisfaction	0.80	1.24	0.77–0.85	0.72	1.39	0.62–0.84
Partner aggression perpetration	1.11	1.11	1.06–1.17	–	–	–
Partner aggression victimization	1.08	1.08	1.03–1.14	–	–	–
Workplace Level						
Weekly hours worked	0.91	1.10	0.87–0.96	–	–	–

Note. OR = odds ratio, the natural exponentiation of the logistic regression coefficient ( $e^b$ ). |OR| = the natural exponentiation of the absolute value of the logistic regression coefficient ( $e^{|b|}$ ).

<sup>a</sup>Total weighted  $N = 22,559$ . <sup>b</sup>Total weighted  $N = 2,389$ .

### *Child Emotional Abuse*

As with child physical maltreatment, the child emotional abuse models were first developed using married parents only, then cross-validated to single parents (all models cross-validated). Descriptive statistics and bivariate relations are presented in Table 22. To aid in comparing the effects of risk versus promotive factors for child emotional abuse, we also present “absolute” odds ratios, which are the increases in odds given a one-standard-deviation shift in a direction that increases risk (i.e., higher for risk factors, lower for promotive factors). Most of the study variables from the individual, family, and community levels were significantly related to fathers’ child emotional abuse, whereas significant predictors of mothers’ aggression were all individual- or family-level variables. Only one workplace variable — satisfaction with the Air Force — was significant, and that only for fathers. Gender differences in significant findings seemed largely attributable to the much greater power that was present (due to a much larger sample size) for analyses of fathers’ data; no bivariate associations predicting child emotional abuse were significantly stronger for fathers than mothers (all  $z < 1.96$ ).

**Did risk and promotive factors from all four ecological levels uniquely predict child emotional abuse?** No (see Table 23). For fathers, seven of the eight family-level variables and a single individual variable (i.e., depressive symptoms) were retained in the overall model. No workplace or community variables contributed to the model. The final overall model for mothers contained only parent-child relationship satisfaction, length of marriage, depressive symptoms, parent-child physical aggression, and partner aggression perpetration — notably, these were also the five strongest predictors in the final model for fathers, suggesting that risk and promotive factors for mothers’ and fathers’ child emotional abuse are similar (see also structural equation modeling results below).

Table 22

*Bivariate Odds Ratios and 95% Confidence Intervals for Potential Risk/Promotive Factors Predicting Married Active-Duty Parents' Child Emotional Abuse*

Variable	<i>M</i> ( <i>SD</i> )	Fathers			Mothers					<i>z</i>
		<i>OR</i>	95% <i>CI</i>	<i>OR</i>	<i>M</i> ( <i>SD</i> )	<i>OR</i>	95% <i>CI</i>	<i>OR</i>		
Individual Variables										
Depressive symptoms	1.44 (0.58)	<b>1.43</b>	<b>1.30–1.57</b>	<b>1.43</b>	1.56 (0.63)	<b>1.90</b>	<b>1.27–2.83</b>	<b>1.90</b>	1.36	
Personal coping	4.22 (0.46)	<b>0.72</b>	<b>0.64–0.80</b>	<b>1.39</b>	4.11 (0.51)	<b>0.66</b>	<b>0.45–0.97</b>	<b>1.52</b>	-.42	
Physical well being	4.12 (0.70)	<b>0.76</b>	<b>0.69–0.84</b>	<b>1.32</b>	3.99 (0.73)	<b>0.63</b>	<b>0.44–0.91</b>	<b>1.58</b>	-.95	
Financial stress	1.81 (0.88)	<b>1.27</b>	<b>1.13–1.43</b>	<b>1.27</b>	1.66 (0.86)	<b>1.58</b>	<b>1.07–2.35</b>	<b>1.58</b>	1.04	
Years of military service	13.65 (6.29)	<b>1.15</b>	<b>1.04–0.28</b>	<b>1.15</b>	11.06 (5.88)	<b>1.60</b>	<b>1.05–2.45</b>	<b>1.60</b>	1.48	
Alcohol problems	2.96 (3.23)	<b>1.13</b>	<b>1.02–1.26</b>	<b>1.13</b>	1.82 (1.99)	1.18	0.76–1.85	1.18	.18	
Religious involvement	3.25 (1.09)	0.90	0.80–1.02	1.11	3.30 (1.01)	0.86	0.57–1.29	1.17	-.26	
Family Variables										
Parent–child rel. satisf.	5.10 (0.75)	<b>0.50</b>	<b>0.44–0.56</b>	<b>2.01</b>	5.23 (0.75)	<b>0.41</b>	<b>0.27–0.63</b>	<b>2.43</b>	-.86	
Parent–child physical aggr.	1.31 (1.62)	<b>1.62</b>	<b>1.49–1.76</b>	<b>1.62</b>	1.34 (1.64)	<b>1.67</b>	<b>1.26–2.22</b>	<b>1.67</b>	.22	
Family coping	4.95 (1.10)	<b>0.65</b>	<b>0.58–0.73</b>	<b>1.53</b>	5.18 (0.90)	0.70	0.48–1.01	1.44	.33	
Relationship satisfaction	5.82 (1.13)	<b>0.71</b>	<b>0.64–0.78</b>	<b>1.41</b>	5.76 (1.27)	0.77	0.56–1.07	1.30	.49	
Number of children	1.97 (0.87)	<b>1.34</b>	<b>1.19–1.50</b>	<b>1.34</b>	1.74 (0.81)	<b>1.65</b>	<b>1.08–2.53</b>	<b>1.65</b>	.94	
Partner aggr. perpetration	0.11 (1.11)	<b>1.32</b>	<b>1.25–1.40</b>	<b>1.32</b>	0.29 (2.40)	<b>1.37</b>	<b>1.16–1.60</b>	<b>1.37</b>	.35	
Partner aggr. victimization	0.37 (2.29)	<b>1.31</b>	<b>1.23–1.40</b>	<b>1.31</b>	0.26 (2.05)	1.30	0.98–1.73	1.30	-.07	
Spouse prep. for deployment	3.18 (0.77)	<b>0.79</b>	<b>0.70–0.88</b>	<b>1.27</b>	3.06 (0.90)	0.92	0.64–1.32	1.09	.79	
Length of marriage	10.02 (6.33)	<b>1.23</b>	<b>1.11–1.38</b>	<b>1.23</b>	7.25 (5.52)	<b>1.64</b>	<b>1.08–2.47</b>	<b>1.64</b>	1.29	
Career support from partner	4.97 (1.05)	<b>0.83</b>	<b>0.74–0.92</b>	<b>1.21</b>	5.23 (0.94)	0.85	0.58–1.24	1.18	.12	
Family income (monthly \$)	8105 (4709)	<b>1.16</b>	<b>1.04–1.30</b>	<b>1.16</b>	6880 (3171)	0.99	0.64–1.51	1.01	-.73	
Workplace Variables										
Satisfaction with the AF	4.28 (0.96)	<b>0.82</b>	<b>0.73–0.92</b>	<b>1.22</b>	4.54 (1.03)	0.78	0.53–1.11	1.30	-.36	
Workplace rel. satisfaction	3.99 (0.84)	0.92	0.82–1.02	1.09	3.84 (0.89)	0.80	0.54–1.18	1.25	-.68	
Weekly hours worked	50.32 (12.96)	0.92	0.83–1.02	1.08	46.45 (13.18)	1.29	0.88–1.88	1.29	1.66	
Support from leadership	4.11 (0.91)	0.92	0.84–1.02	1.08	4.04 (0.95)	0.82	0.57–1.20	1.22	-.59	
Workgroup cohesion	4.19 (1.08)	0.94	0.82–1.05	1.06	3.90 (1.16)	0.70	0.45–1.08	1.43	-1.32	
Weeks deployed in past year	7.96 (10.74)	1.01	0.91–1.12	1.01	4.16 (7.92)	1.12	0.72–1.74	1.12	.44	

Community Variables									
Community safety	5.07 (0.73)	<b>0.82</b>	<b>0.74–0.90</b>	<b>1.23</b>	5.05 (0.76)	0.69	0.47–1.01	1.46	-.84
Community unity	4.09 (0.85)	<b>0.84</b>	<b>0.76–0.93</b>	<b>1.19</b>	4.10 (0.87)	0.69	0.46–1.03	1.45	-.94
Support for youth	4.29 (1.01)	<b>0.85</b>	<b>0.76–0.94</b>	<b>1.18</b>	4.29 (1.02)	1.00	0.67–1.49	1.00	.79
Social support	4.31 (1.40)	<b>0.85</b>	<b>0.77–0.94</b>	<b>1.18</b>	4.18 (1.50)	0.90	0.62–1.30	1.11	.29
Support from neighbors	3.67 (1.03)	<b>0.90</b>	<b>0.81–0.99</b>	<b>1.12</b>	3.53 (1.11)	1.24	0.87–1.76	1.24	1.73
Community resources	4.09 (0.90)	0.91	0.82–1.00	1.10	4.10 (0.92)	0.85	0.57–1.26	1.18	.31
Formal agency support	4.38 (0.96)	0.91	0.81–1.02	1.10	4.52 (0.99)	0.89	0.62–1.28	1.12	-.10

*Note.* Computed using married parents in development subsample only (weighted  $n = 11,259$  fathers and 1,195 mothers). All aggression variables refer to physical aggression. **Bold text** indicates a significant OR ( $p < .05$ ).

Table 23

*Final Multivariate Logistic Regression Models Predicting Married Active-Duty Parents' Child Emotional Abuse*

Variable	Fathers <sup>a</sup>			Mothers <sup>b</sup>		
	OR	OR	95% CI	OR	OR	95% CI
Overall						
Parent-child relationship satisfaction	0.63	1.60	0.56–0.70	0.51	1.98	0.40–0.63
Parent-child physical aggression	1.51	1.51	1.41–1.62	1.51	1.51	1.25–1.82
Length of marriage	1.32	1.32	1.19–1.46	1.80	1.80	1.34–2.43
Depressive symptoms	1.22	1.22	1.12–1.32	1.52	1.52	1.23–1.89
Partner aggression perpetration	1.21	1.21	1.16–1.26	1.24	1.24	1.11–1.38
Number of children	1.19	1.19	1.10–1.30	–	–	–
Family coping	0.86	1.16	0.80–0.93	–	–	–
Family income	1.14	1.14	1.03–1.26	–	–	–
Individual Level						
Depressive symptoms	1.31	1.31	1.21–1.42	1.77	1.77	1.44–2.19
Personal coping	0.82	1.21	0.76–0.89	–	–	–
Financial stress	1.17	1.17	1.07–1.27	1.36	1.36	1.07–1.73
Years in the military	1.25	1.25	1.16–1.35	1.61	1.61	1.26–2.06
Family Level						
Parent-child relationship satisfaction	0.60	1.67	0.54–0.67	0.46	2.17	0.37–0.58
Parent-child physical aggression	1.55	1.55	1.45–1.66	1.53	1.53	1.26–1.86
Length of marriage	1.43	1.43	1.31–1.56	1.73	1.73	1.28–2.33
Partner aggression perpetration	1.21	1.21	1.16–1.27	1.26	1.26	1.14–1.40
Family coping	0.84	1.19	0.78–0.90	–	–	–
Workplace Level						
Satisfaction with the AF	0.82	1.22	0.76–0.89	–	–	–
Community Level						
Community unity	0.87	1.14	0.79–0.97	–	–	–
Community safety	0.90	1.11	0.83–0.99	–	–	–

*Note.* OR = odds ratio, the natural exponentiation of the logistic regression coefficient ( $e^b$ ). |OR| = the natural exponentiation of the absolute value of the logistic regression coefficient ( $e^{|b|}$ ).

<sup>a</sup>Total weighted  $N = 22,559$ . <sup>b</sup>Total weighted  $N = 2,389$ .



## Protective/Interactive Relations

### *Alcohol Problems and Partner Physical Assault*

Alcohol abuse is a well-established risk factor for men's intimate partner violence (IPV), with dozens of studies demonstrating the association. Analyses were conducted that extended understanding of this link by examining what protective factors buffer this association in a more systematic and broader way than had been done in past studies. Individual, family, workplace, community, and developmental factors were tested as moderators of the alcohol-IPV link (see Table 24). Two family variables (relationship satisfaction and parent-child satisfaction), one community variable (community safety), and three developmental variables (years in the military, marital length, and family income/pay grade) were cross-validated as significant moderators of the association between men's alcohol abuse and IPV. Across the significant moderators, the association between alcohol and IPV was weakened by maturation/development, improved community safety, and better relationship functioning. No individual or workplace variables were significant moderators for men, and there were no significant moderators found for women. The results support the importance of a developmental and relational perspective — rather than solely an individual coping perspective — to understanding the alcohol-IPV link.

Table 24

*Men's Alcohol Problems Predicting IPV at High, Medium, and Low Levels of Significant Protective Factors*

Levels of Protective Factors	<i>b</i>	<i>SE</i>	<i>t</i>	<i>p</i>
<i>Relationship satisfaction</i>				
Low	0.29	0.03	8.55	0.000
Medium	0.22	0.03	6.55	0.000
High	0.17	0.03	4.88	0.000
<i>Parent-child relations</i>				
Low	0.21	0.04	5.32	0.000
Medium	0.14	0.03	4.78	0.000
High	0.08	0.04	2.08	0.038
<i>Family income/Pay grade</i>				
Low	0.31	0.03	9.06	0.000
Medium	0.21	0.03	7.71	0.000
High	0.10	0.04	2.36	0.018
<i>Marital length</i>				
Low	0.30	0.04	7.80	0.000
Medium	0.19	0.03	6.83	0.000
High	0.08	0.04	1.98	0.048
<i>Years in the military</i>				
Low	0.31	0.03	9.01	0.000
Medium	0.20	0.03	7.55	0.000
High	0.10	0.04	2.55	0.011
<i>Community safety</i>				
Low	0.32	0.03	12.23	0.000
Medium	0.27	0.03	9.66	0.000
High	0.23	0.04	5.46	0.000
<i>Spirituality/religiosity</i>				
Low	0.31	0.03	9.12	0.000
Medium	0.26	0.03	9.80	0.000
High	0.22	0.04	5.92	0.000

*Note.* *N* = 5,397 men for all variables except those that were only answerable by married individuals (marital length: *n* = 4,578 men) or parents (parent child relations: *n* = 3,353 men).

### *Suicidality and Relationship Satisfaction*

Satisfaction with one's current romantic relationship reduces risk (and hence, dissatisfaction increases risk) for suicidal ideation (see Table 7). Analyses were conducted that extended understanding of this link by examining individual, family, workplace, community, and developmental factors as potential moderators of the suicidality-relationship satisfaction link. Cross-validated results are presented as multivariate logistic regression coefficients in Table 25. Three individual variables, one family variable, and one developmental variable were cross-validated as significant moderators of the association between men's relationship satisfaction and suicidal thoughts. Two (physical well being and years in the military) can be seen as "boosters" of relationship satisfaction; not only did these variables themselves reduce risk for suicidality, they increased the health-promotive effect of relationship satisfaction. This suggests that efforts to reduce suicide risk in AD men by improving relationship satisfaction may be more effective among (a) those who have been in the military longer and (b) the physically healthy. The other three moderators (financial stress, alcohol problems, and partner physical assault victimization), in contrast, had the opposite effect: in addition to increasing suicidality risk themselves, they weakened the promotive effect of relationship satisfaction. This suggests that efforts to reduce suicide risk in AD men by improving relationship satisfaction may be less effective if any of these three risk factors are present. No workplace or community variables were significant moderators for men, and the only significant moderator for women was alcohol consumption (which operated as alcohol problems did in the analyses of men's data).

Table 25

*Significant Moderators of the Association Between Relationship Satisfaction and Suicidal Thoughts*

Moderator	Moderator <i>b</i>	RELSAT <i>b</i> when moderator is			
		low	Med	HIGH	
Men					
Physical well being	-.54	-.63	-.72	-.82	
Years in military	-.27	-.51	-.59	-.67	
Financial stress	.50	-.69	-.58	-.47	
Alcohol problems <sup>a</sup>	.39	-.63	-.56	-.50	
Partner assault victimization	.27	-.59	-.54	-.49	
Women					
Alcohol consumption <sup>b</sup>	.31	-.46	-.34	-.21	

*Note.* RELSAT = relationship satisfaction. Med = medium (i.e., at its mean); low and HIGH represent -1 SD and +1 SD, respectively. All *b* significant at  $p < .001$ .

<sup>a</sup>Problematic alcohol-related consequences factor score on the AUDIT. <sup>b</sup>Alcohol consumption factor score on the AUDIT.

*Child Physical Assault and Depressive Symptoms*

Depression is well known to impair functioning in most aspects of life; for parents, it has been shown to increase risk for poor parent-child relationships and child abuse, most of which research has been conducted with mothers only. Analyses were conducted that extended understanding of this link by (a) using a large sample of fathers<sup>4</sup> and (b) hypothesizing that — in addition to being associated with higher child physical assault scores — see risk and promotive factor results, above — depressive symptoms would have moderating effects on individual, family, workplace, and community promotive factors. Specifically, it was hypothesized that high levels of depressive symptoms would reduce or negate potentially health-promoting effects from other sources. Cross-validated results are presented as standardized multivariate linear regression coefficients in Table 26. One individual factor, four workplace factors, and three community factors were identified that were significant promotive factors bivariate and at low levels of depressive symptoms, but lost their promotive power at high (+1 SD) or even average levels of depression. The graph of the interaction with community unity (as depicted in Figure 1) is representative of all of these moderation effects. These results suggest that child physical assault levels are unlikely to be reduced by interventions designed to improve workplace and community support unless depressive symptoms are also alleviated.

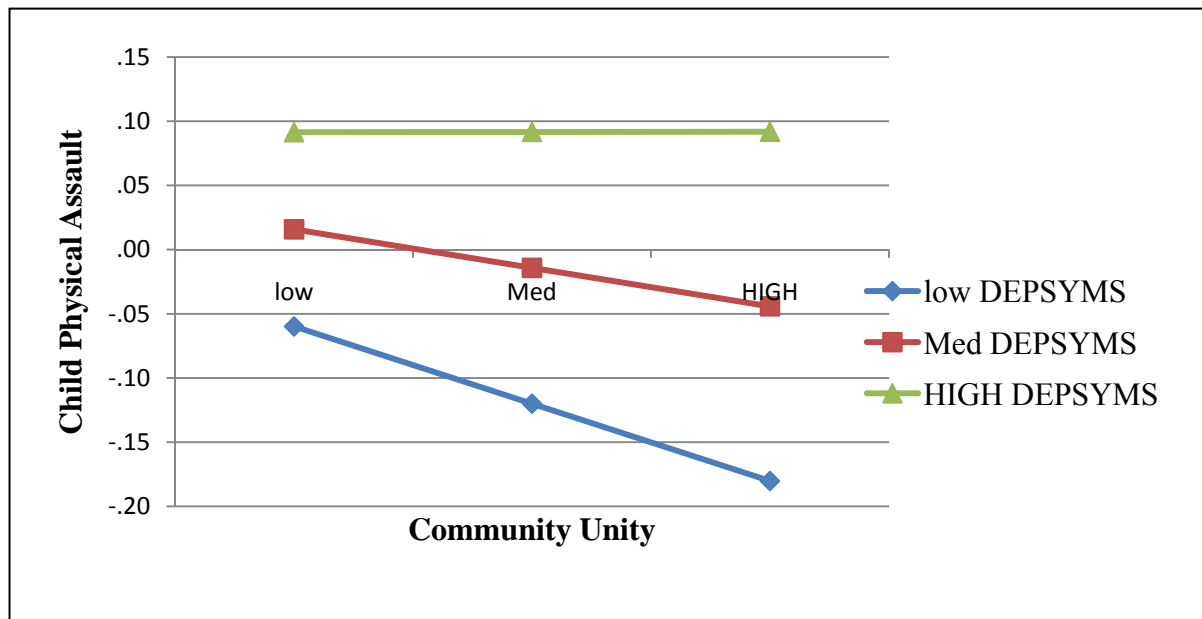
<sup>4</sup> No significant moderators were found for mothers.

Table 26

*Depressive Symptoms' Significant Moderation Effects on Associations Between Promotive Factors and Fathers' Child Physical Assault*

Variable	Bivariate	<i>B</i> when DEPSYMS are		
	<i>r</i>	low	Med	HIGH
Satisfaction with the AF	-0.06***	-0.08***	-0.05**	-0.01
Support from leadership	-0.07***	-0.07***	-0.04**	-0.01
Community unity	-0.05***	-0.06***	-0.03**	0.00
Work relationship satisfaction	-0.05***	-0.05**	-0.03*	0.00
Workgroup cohesion	-0.05***	-0.05**	-0.02	0.02
Physical well being	-0.06***	-0.05**	-0.02	0.01
Support from formal agencies	-0.03**	-0.04**	-0.01	0.01
Support from neighbors	-0.03**	-0.04**	-0.01	0.01

*Note.* DEPSYMS = depressive symptoms. Med = medium (i.e., at its mean); low and HIGH represent -1 SD and +1 SD, respectively.



*Figure 1.* Standardized child physical assault scores at different levels of depressive symptoms and community unity. DEPSYMS = depressive symptoms. Med = medium (i.e., at its mean); low and HIGH represent -1 SD and +1 SD, respectively.

### *Child Physical Assault and Child Physical Abuse*

As discussed above, the child physical assault module of the CA resulted in a variety score — that is, the number of different aggressive acts against a child committed in the past year. Most parents with low non-zero variety scores reported engaging in only mild acts like spanking and slapping, whereas parents who reported relatively severe acts did not tend to report *only* severe discipline (e.g., most parents who had choked or beat up their children had also spanked, slapped, and pinched). Thus, child physical assault variety scores mostly paralleled the severity of the acts engaged in; unsurprisingly, these scores had strong associations with the likelihood of leaving a mark on or otherwise injuring a child (i.e., child physical abuse). Indeed a one-standard-deviation increase in the child assault score was found to increase the odds of child physical abuse by a multiplicative factor of approximately 2.5 for both mothers and fathers. Analyses were conducted that extended understanding of this link by examining individual, family, workplace, community, and developmental factors as potential moderators of the child assault-abuse link. No significant moderators were found for mothers; cross-validated results for fathers are presented in Table 27. Key findings were as follows:

- Alcohol problems were the only moderator that decreased the strength of the assault-abuse link. However, as alcohol problems themselves increase risk for child abuse, the significant interaction suggests that child physical assault and alcohol problems account for some of the same variance in the likelihood of abuse. It also suggests that in cases where both child assault and alcohol problems are high, *both* may need to be addressed if an intervention is to substantially reduce risk that an AD man will engage in child abuse.
- As discussed previously, religious involvement represented a robust risk factor for child abuse. These analyses demonstrated that high levels of religious involvement also increased the association between fathers' physical assault scores and the likelihood of child abuse.
- The results for developmental factors (i.e., length of marriage, years in the military) were surprising. Non-significant promotive factors bivariate, these variables became significant *risk* factors when child physical assault scores were held constant at their means. In addition, the assault-abuse association was even stronger for more mature fathers than less mature fathers (with maturity defined by length of marriage or years in the military).
- Career support from partner was not predictive of child physical abuse in the bivariate or multivariate context; however, like length of marriage and years in the military, higher levels of career support from partner strengthened the assault-abuse link. It seems unlikely that this is due to partner career support per se. Rather, interpreted in the context of the developmental moderators, it may be that the assault-abuse link is stronger among career AF men, who would likely score higher on both years in the military and career support from partner. (Those whose partners do not support their AF careers are unlikely to remain in the AF for very long.)

Table 27

*Significant Moderators of the Association Between Relationship Satisfaction and Suicidal Thoughts*

Moderator	Moderator	Moderator	Child assault OR when moderator is		
	bivariate OR	multivariate OR	low	Med	HIGH
Alcohol problems <sup>a</sup>	1.12 <sup>***</sup>	1.25 <sup>***</sup>	3.55 <sup>***</sup>	2.84 <sup>***</sup>	2.27 <sup>***</sup>
Religious involvement	1.18 <sup>***</sup>	1.17 <sup>***</sup>	2.43 <sup>***</sup>	2.61 <sup>***</sup>	2.79 <sup>***</sup>
Length of marriage	0.97	1.11 <sup>**</sup>	2.44 <sup>***</sup>	2.65 <sup>***</sup>	2.88 <sup>***</sup>
Years in the military	0.93	1.08 <sup>*</sup>	2.44 <sup>***</sup>	2.66 <sup>***</sup>	2.90 <sup>***</sup>
Career support from partner	0.98	0.97	2.40 <sup>***</sup>	2.66 <sup>***</sup>	2.95 <sup>***</sup>

*Note.* OR = odds ratio. Med = medium (i.e., at its mean); low and HIGH represent -1 SD and +1 SD, respectively.

<sup>a</sup>Problematic alcohol-related consequences factor score on the AUDIT.

### *Child Emotional Abuse and Parent-Child Relationship Satisfaction*

Poor parent-child relationship quality and child emotional abuse are inextricably linked. In the current sample, parent-child relationship satisfaction had by far the strongest association with emotional abuse of all predictors tested. Indeed, a one-standard-deviation increase in parent-child relationship satisfaction was found to cut the odds of child emotional abuse by at least half — and a one-SD decrease in parent-child relationship satisfaction to at least double the odds — for both mothers (OR = .41; |OR| = 2.47) and fathers (OR = .50; |OR| = 2.01). Clearly, the quality of the parent-child relationship should be targeted when trying to prevent or intervene for child emotional maltreatment. However, what else should be addressed? Many other variables in the study also predicted child emotional abuse; which should be targeted if parenting prevention/intervention activities are to be maximally effective? We sought to answer this question by examining individual, family, workplace, and community factors as potential moderators of the child assault-abuse link. It was hypothesized, in particular, that individual and family factors would significantly moderate the association between parent-child relationship satisfaction and child emotional abuse. Once again, no significant moderators were found for mothers (probably due to issues with sample size and concomitant reductions in power). However, results for fathers were more encouraging (see Table 28). Specifically, two family-level variables (relationship satisfaction and family coping ability) were cross-validated as significant moderators. The results suggest that successfully addressing the (rather than just the parent-child relationship) in families at risk for child emotional is likely to be particularly effective, both (a) because relationship satisfaction and family coping reduce risk for emotional abuse and (b) because as these factors increase, the health-promoting effects of improved parent-child relationship quality also increase.

Table 28

*Significant Moderators of the Association Between Parent-Child Relationship Satisfaction and Child Emotional Abuse*

Moderator	Moderator <i>b</i>	PCREL <i>b</i> When Moderator is		
		low	Med	HIGH
Relationship satisfaction	-.24	-.59	-.68	-.78
Family coping	-.28	-.55	-.64	-.74

*Note.* PCREL = parent-child relationship satisfaction. Med = medium (i.e., at its mean); low and HIGH represent -1 SD and +1 SD, respectively.



## Structural Equation Modeling

### *Alcohol Problems*

Hazardous drinking is a serious societal concern in military populations, and efforts to reduce hazardous drinking among military personnel have been limited in effectiveness. Community-wide prevention efforts may be most effective in targeting community functioning variables (e.g., support from formal agencies, community) that impact hazardous drinking via other, more proximal risk factors. The goal of these structural equation modeling analyses was to inform community-wide prevention efforts by testing a hypothesized model of community functioning and mediating risk factors of hazardous drinking (see Figure 2).

Final structural equation models—computed using active duty member data only, weighted to the Air Force population—are presented in Figures 3 and 4. Depressive symptoms, perceived financial stress, and satisfaction with the Air Force were identified as significant mediators of the link between community functioning and hazardous drinking for men and women. Relationship satisfaction was also identified as a mediator for men. These results provide a framework for further community prevention research and suggest that prevention efforts geared at increasing aspects of community functioning (e.g., the U.S. Air Force Community Capacity model) may indirectly lead to reductions in hazardous drinking.

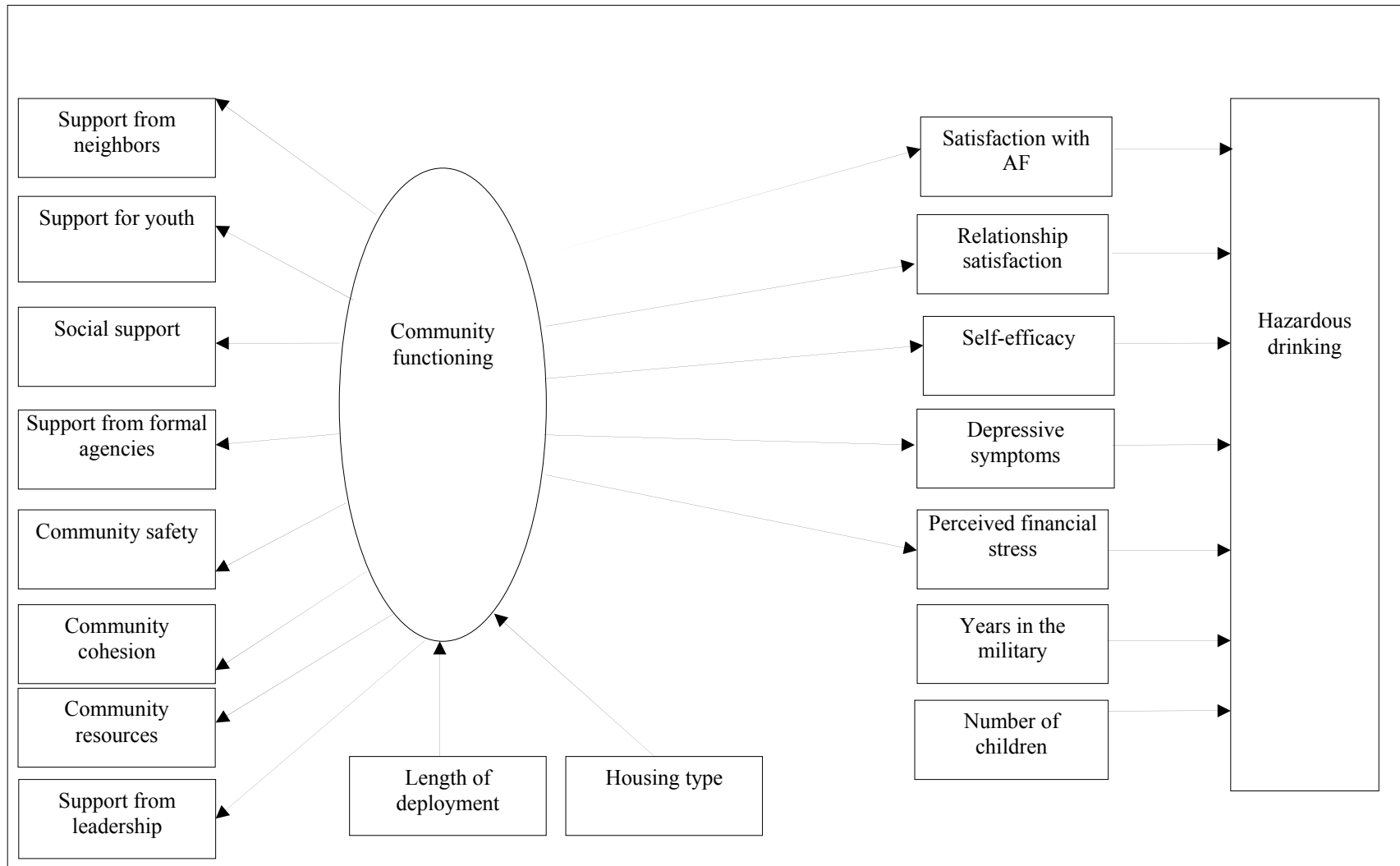


Figure 2. Hypothesized model of hazardous drinking and community functioning.

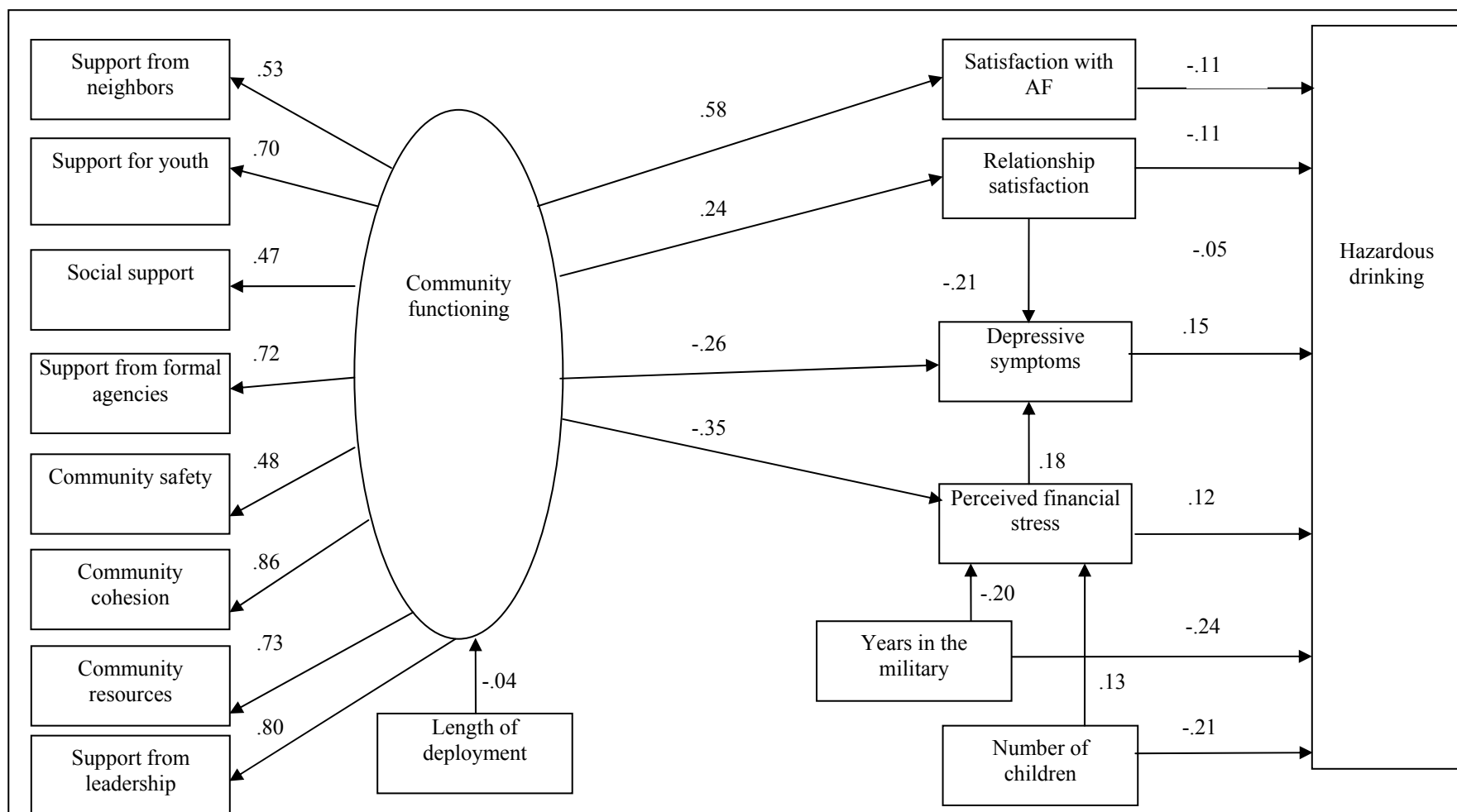


Figure 3. Final model of men's hazardous drinking and community functioning.  $n = 40,554$ . Standardized coefficients are presented for the constrained multi-group analysis. In addition, the following variables were allowed to correlate: social support and support from neighbors (standardized coefficient = .24). All paths were significant,  $p < .001$ . Amount of variance explained in the model was as follows: Hazardous drinking  $r^2 = .25$ , Satisfaction with the Air Force  $r^2 = .34$ , Relationship satisfaction  $r^2 = .06$ , Depressive symptoms  $r^2 = .21$ , Financial stress  $r^2 = .16$ .

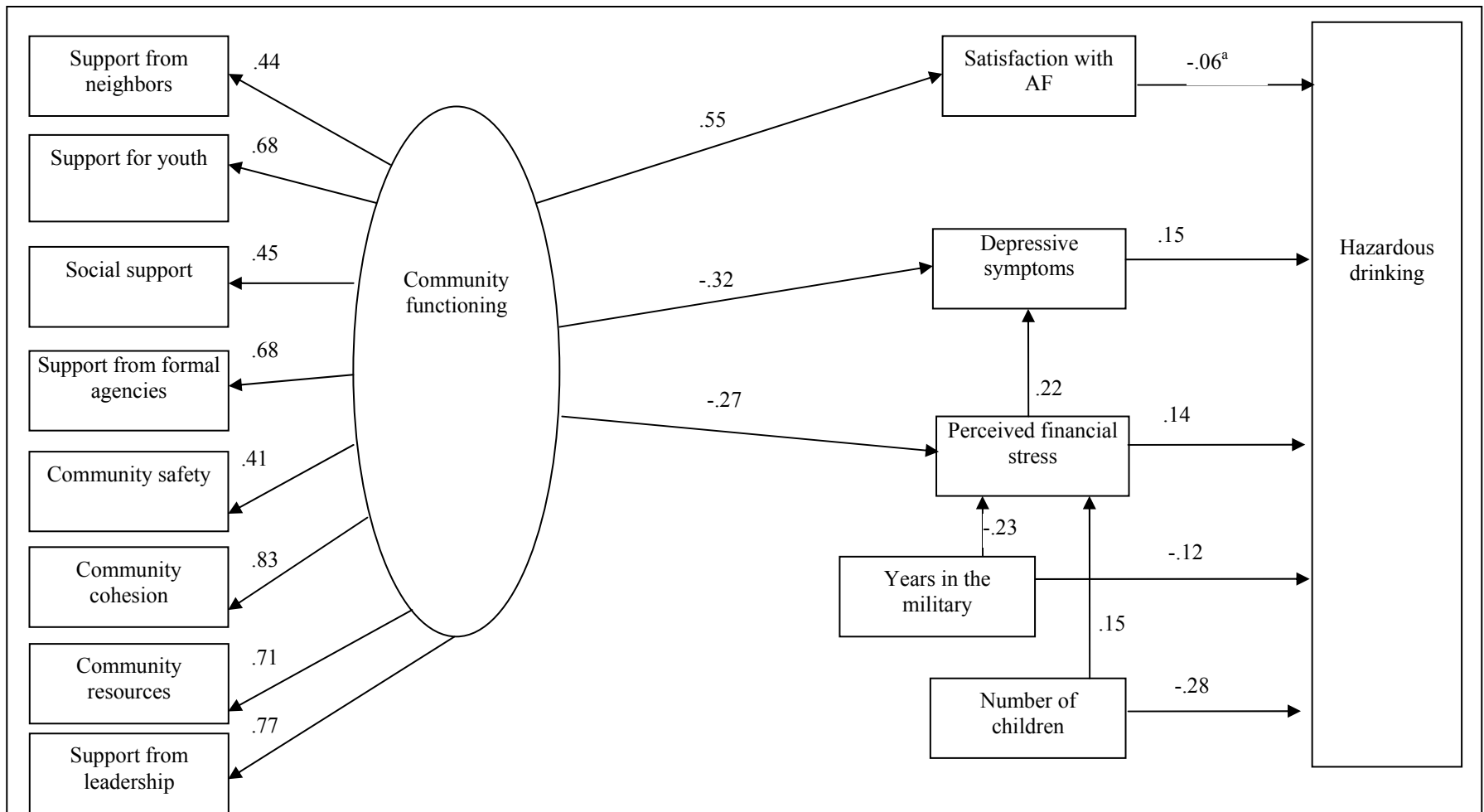


Figure 4. Model of women's hazardous drinking and community functioning.  $n = 10,604$ . Standardized coefficients are presented for the constrained multi-group analysis. In addition, the following variables were allowed to correlate: social support and support from neighbors (standardized coefficient = .20). All paths were significant,  $p < .001$  except <sup>a</sup> $p = .026$ . Amount of variance explained in the model was as follows: Hazardous drinking  $r^2 = .18$ , Satisfaction with the Air Force  $r^2 = .30$ , Depressive symptoms  $r^2 = .19$ , Financial stress  $r^2 = .13$ .

### *Partner Physical Assault and Abuse Perpetration*

Intimate partner violence (IPV) is a significant public health concern. To date, theoretical and empirical models of IPV — as well as the intervention and prevention programs derived from such models — have rarely distinguished between IPV that causes injury (i.e., partner physical abuse) and relatively minor partner assault. Past work has also typically examined and/or targeted a limited number of risk factors operating at the level of the individual perpetrator. In contrast, the current study proposed and tested an integrated model predicting both partner physical abuse and partner assault using risk and promotive factors drawn from multiple ecological levels of influence (i.e., individual, family, workplace, community).

Final structural equation models for men and women, cross-validated in holdout samples, clearly supported the relevance of an ecological approach to IPV (see Figures 5 and 6). Risk and promotive factors from all four levels were associated with both minor partner assault and injurious partner physical abuse, with relatively distal community and workplace factors operating via more proximal individual- and family-level variables (e.g., relationship satisfaction). The results suggest a variety of both established and novel potential targets for indirectly targeting IPV by improving people's risk profiles at the individual, family, workplace, and community levels.

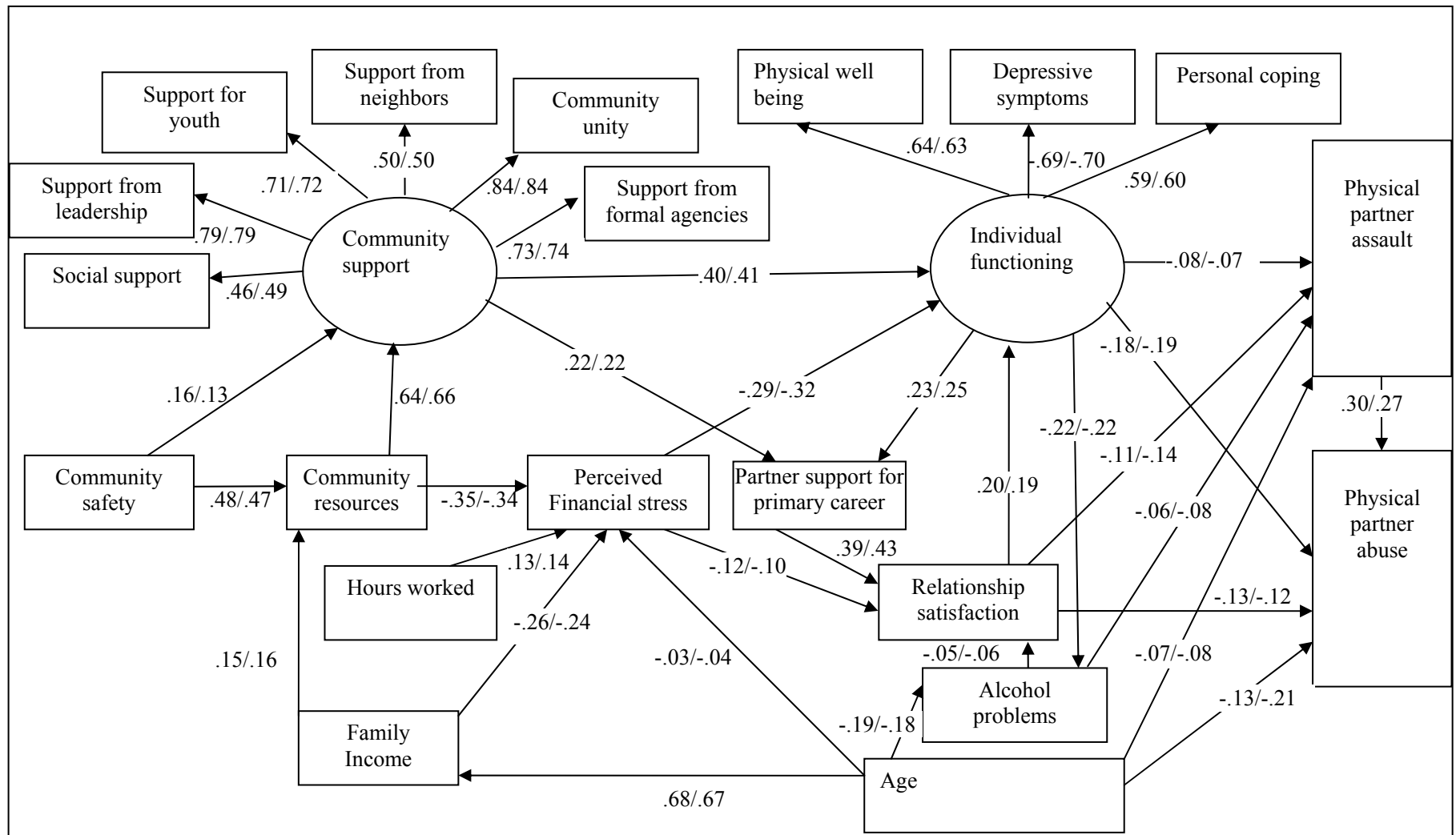


Figure 5. Final structural equation model predicting men's physical partner assault and abuse. Standardized coefficients before the slash are for the development sample, and those after the slash are for the validation sample. In addition, the following variables were

allowed to correlate: community unity and support from leadership (standardized coefficients = .29/.30); social support and support from neighbors (standardized coefficients = .27/.26).  $p < .05$  for age  $\rightarrow$  financial stress; all other paths significant at  $p < .001$ .

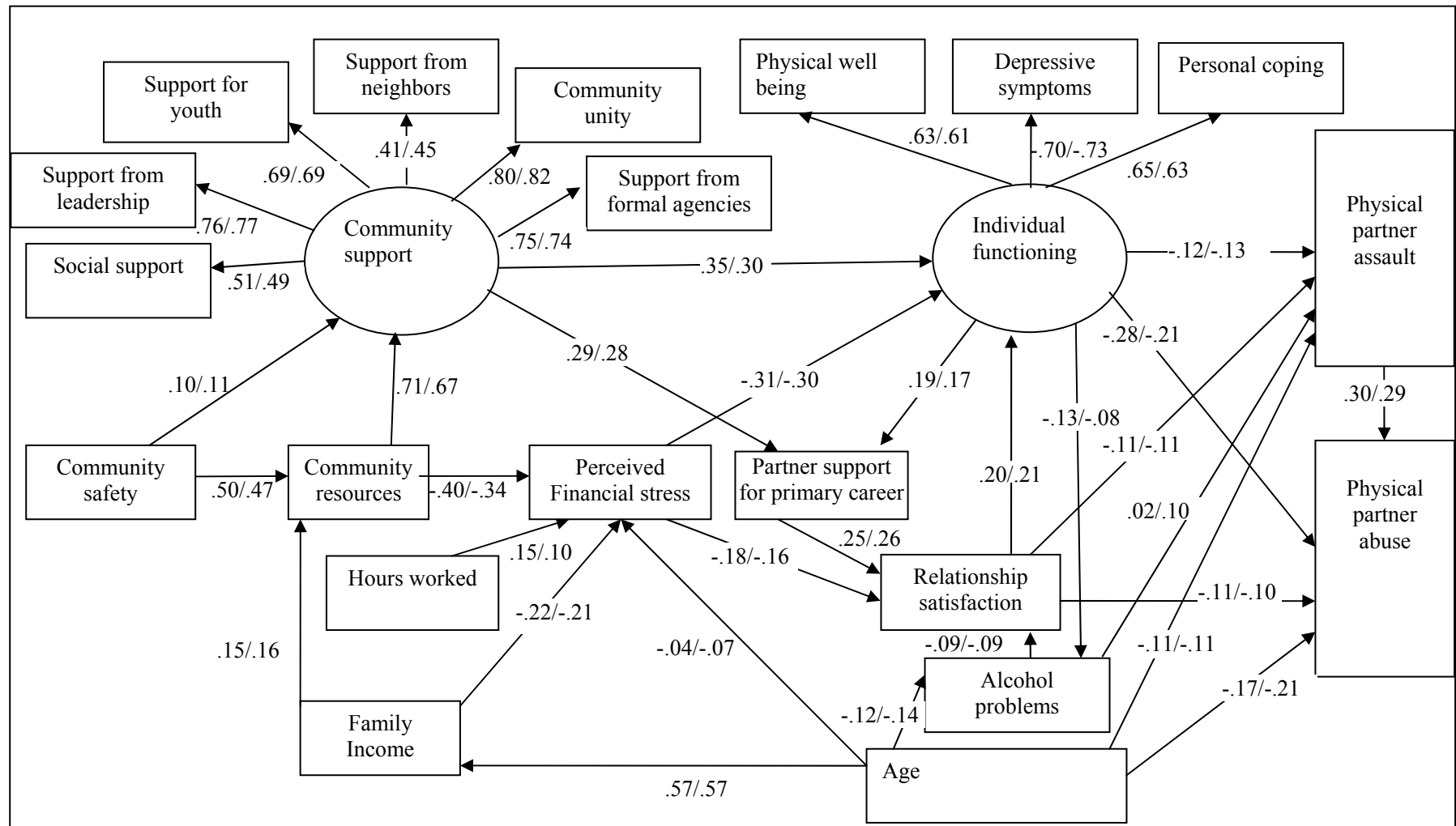


Figure 6. Final structural equation model predicting women's physical partner assault and abuse. Standardized coefficients before the slash are for the development sample, and those after the slash are for the validation sample. In addition, the following variables were allowed to correlate: community unity and support from leadership (standardized coefficient development/validation sample: .38/.34);



social support and support from neighbors (standardized coefficient development/validation sample: .31/.29).  $p < .05$  for age  $\rightarrow$  financial stress, relationship satisfaction  $\rightarrow$  CS-IPV, age  $\rightarrow$  CS-IPV, and alcohol problems  $\rightarrow$  IPV; all other paths significant at  $p < .001$ .

### *Substance Abuse, Partner Physical and Emotional Abuse Victimization, and Suicidality*

Previous research has identified several individual and community variables relevant to health outcomes. For example, problem drinking and prescription drug abuse place one at increased risk for health problems. Low community resources, poor community safety, and financial stress are also risk factors for poor health outcomes. Religious involvement is a promotive factor, in that highly religiously involved individuals tend to be healthier.

The link between family environment and health is also strong. In particular, it is understood that physical and emotional victimization at the hands of one's partner represent important risk factors, and models have linked victimization with health outcomes. Links between (a) the individual- and community-level risk factors discussed above and (b) relationship functioning have also been established. Substance abuse problems impact relationship functioning and increase risk for violence in the relationship. Financial problems are one of the most commonly reported areas of couple conflict; when financial stress is present, this places a couple at higher risk for (a) disagreements over finances, (b) escalation of conflicts, and (c) physical and emotional victimization. Poor community safety and low resources in one's community can lead to stress that spills over to the home environment. Conversely, positive community involvement — such as that available via religious organizations — can provide support to individuals and bolster relationships (e.g., by providing activities the couple can do together, promoting forgiveness, etc.).

What remains unclear is whether family environment functioning explains the association between these risk factors for health or whether it is an independent effect. To test this, we proposed the model depicted in Figure 7. As shown, depressive symptoms, suicidal thoughts, and physical well-being were combined to form a latent “physical and mental health” factor, whereas “relationship functioning” was indexed by relationship satisfaction, family coping, and partner physical and emotional abuse victimization. An initial model was tested in the development sample to see whether risk factors directly predicted the latent physical and mental health factor without relationship functioning in the model. In this multivariate context, all risk factors were significantly associated with physical and mental health (absolute values of the z-scores = 8.04 to 25.11 for men and 4.54 to 21.59 for women). Next, the full model shown in Figure 7 was tested including family environment as a mediating factor between the measured risk factors and health. This model provided a good fit to the data for men [ $\chi^2(34) = 283.79$ , CFI = .97, RMSEA = .02, TLI=.97] and a good fit for women [ $\chi^2(32) = 250.21$ , CFI = .96, RMSEA = .03, TLI=.95]. Direct paths to health from religious involvement for men ( $z=1.42$ ,  $p=.156$ ) and from alcohol problems ( $z=-1.70$ ,  $p=.088$ ) and community safety ( $z=0.55$ ,  $p=0.586$ ) for women were no longer significant once relationship environment was included in the model. The path between prescription drug misuse and relationship environment was also not significant for women ( $z=-1.93$ ,  $p=.053$ ). This indicated that relationship environment did not sufficiently meet criteria for mediation between prescription drug misuse and health outcomes for women, and this path excluded from subsequent mediation tests.

All remaining mediation paths via family environment were tested using bias-corrected bootstrapping with 500 resamples to determine whether the indirect path via relationship environment resulted in a significant reduction in the path coefficients of each risk factor to health. All mediation paths were statistically significant and are presented in Table 29. The models were then re-run, removing the non-significant paths described above. The final models are presented in Figure 8 for men and Figure 9 for women. The final models provided an

excellent fit to the data for men,  $\chi^2(35) = 284.40$ , CFI = .97, RMSEA = .02, TLI=.97, and for women,  $\chi^2(33) = 237.05$ , CFI = .96, RMSEA = .03, TLI=.95; both models cross-validated in the holdout sample. These results supported the hypothesis that a substantial portion of the relations these risk factors have to physical and mental health is due to their associations with relationship functioning, suggesting that this should be accounted for in intervention and prevention planning.

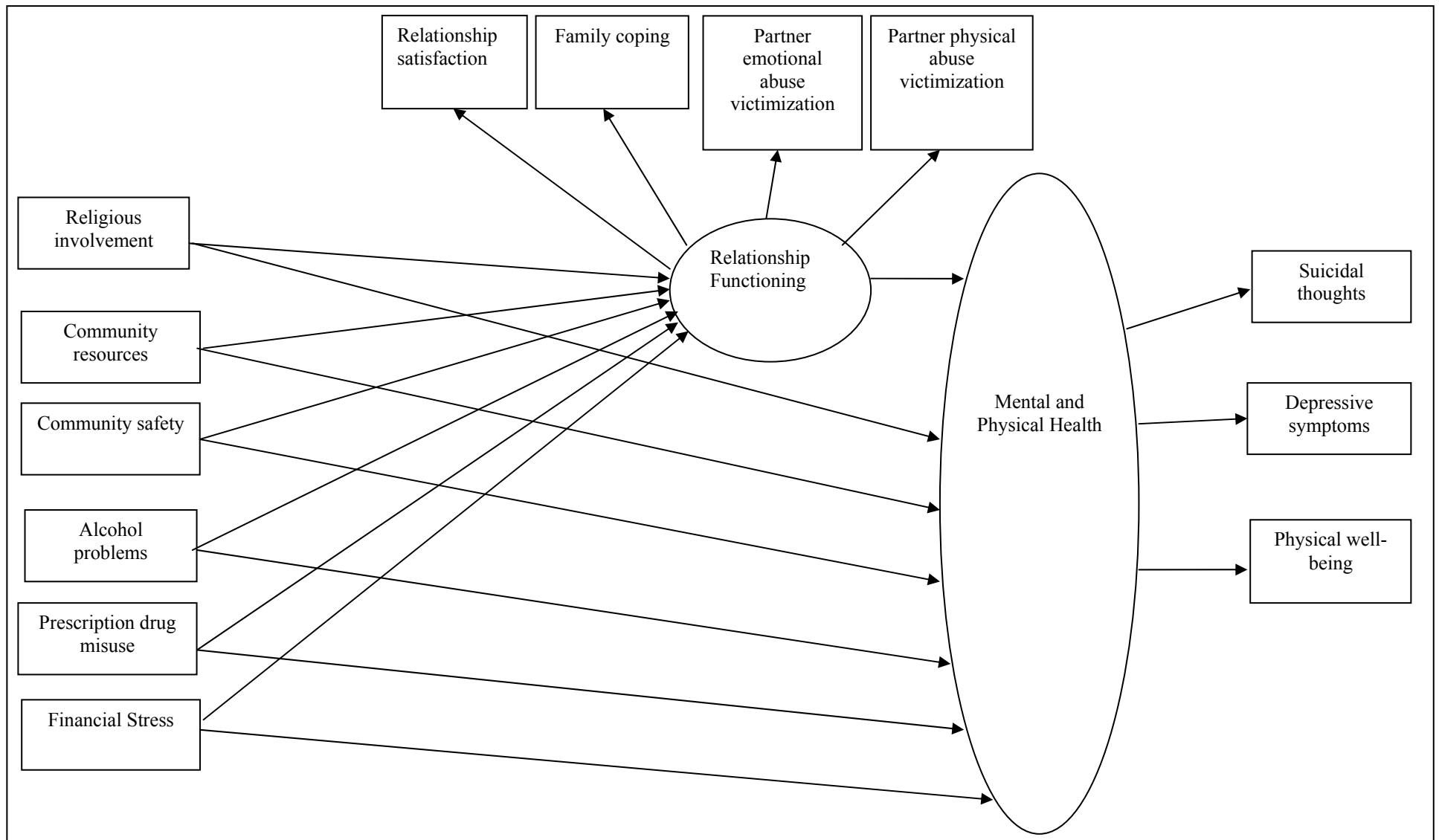


Figure 7. Hypothesized model of risk factors, relationship environment, and mental and physical health.

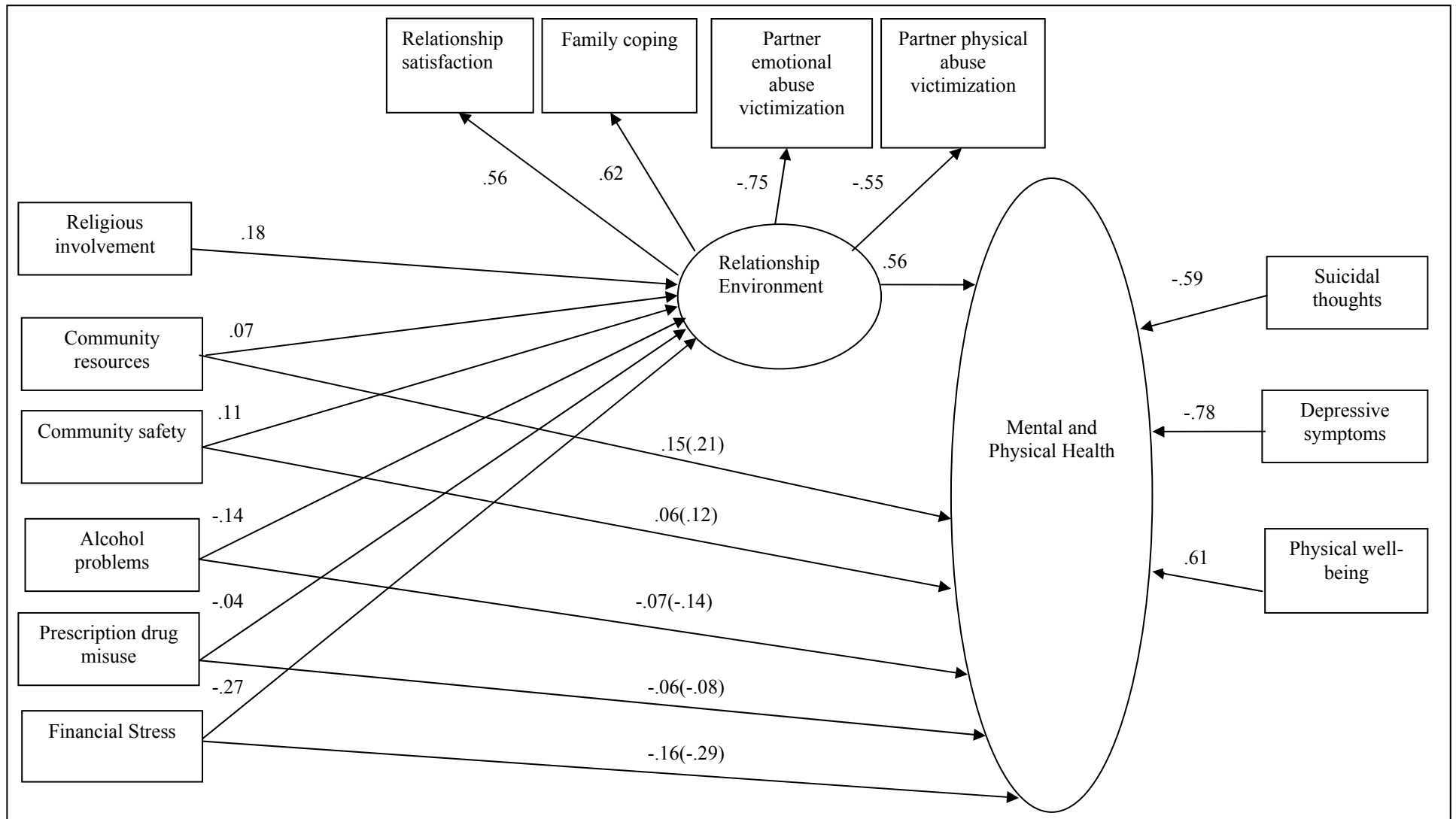


Figure 8. Men's final model of risk factors, relationship functioning, and mental and physical health. Standardized coefficients constrained across development and validation samples are presented. Parameters in parentheses are standardized estimates of unmediated model (i.e., prior to adding relationship environment as a mediator). Family coping and relationship satisfaction were free to covary. All paths depicted were significant at  $p < .001$ .

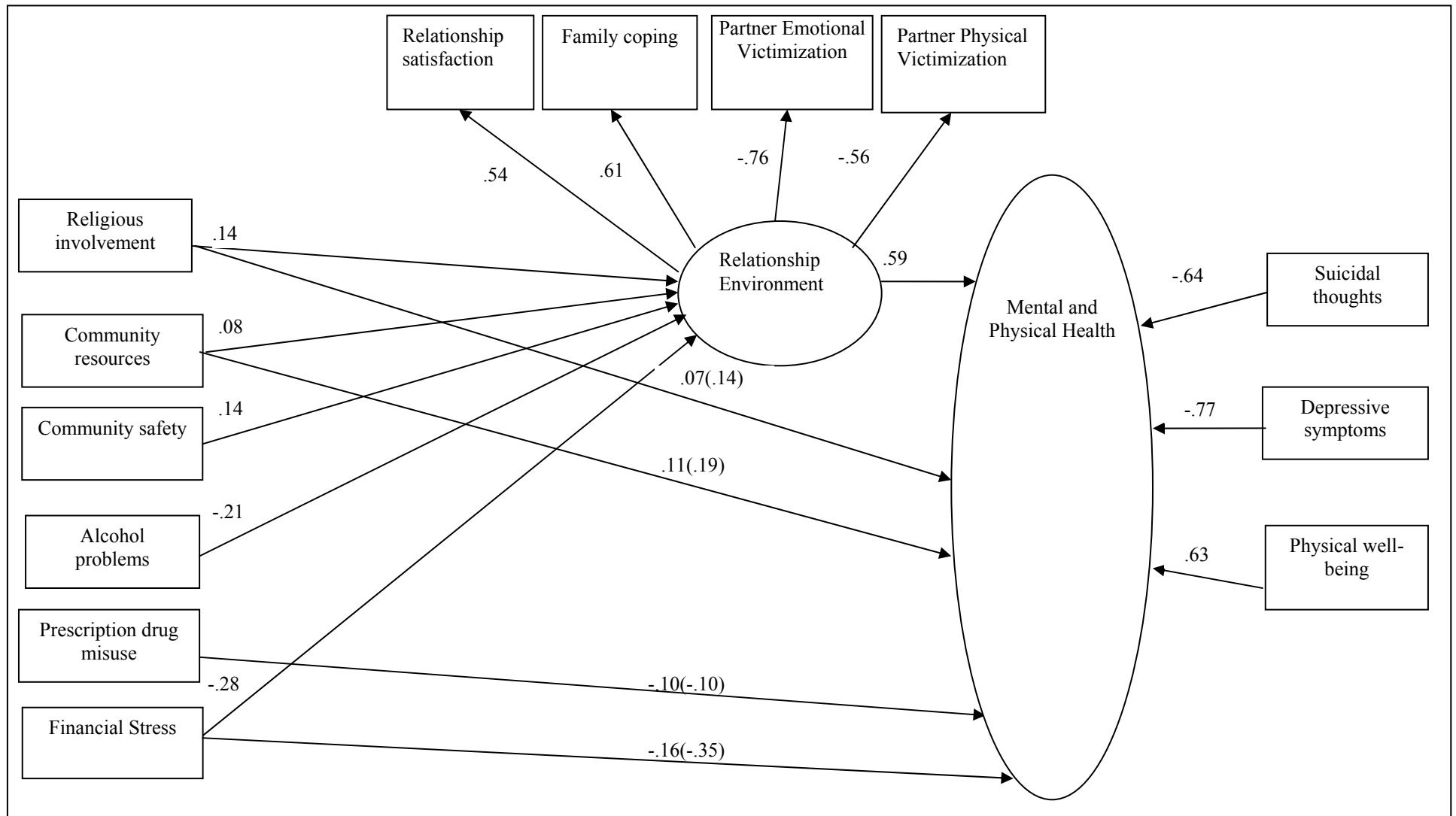


Figure 9. Women's final model of risk factors, relationship functioning, and mental and physical health. Standardized coefficients constrained across development and validation samples are presented. Parameters in parentheses are standardized estimates of unmediated model (i.e., prior to adding relationship environment as a mediator). Family coping and relationship satisfaction were free to covary. All paths depicted were significant at  $p < .001$ .

Table 29

*Indirect Paths to Health via Relationship Environment for Each Risk Factor*

	Estimate	SE	Estimate/SE	95% CI
<u>Men's Risk Factors</u>				
Religious involvement	0.080	0.007	11.060***	0.066–0.080
Community safety	0.062	0.008	7.961***	0.047–0.062
Community satisfaction	0.031	0.007	4.334***	0.017–0.046
Alcohol problems	-0.066	0.007	-7.813***	-0.050–-0.066
Prescription drug misuse	-0.020	0.007	-2.802**	-0.066–-0.034
Financial stress	-0.146	0.010	-14.914***	-0.126–-0.165
<u>Women's Risk Factors</u>				
Religious involvement	0.073	0.008	9.398***	0.058–0.089
Community safety	0.071	0.009	8.036***	0.053–0.088
Community satisfaction	0.044	0.009	4.824***	0.026–0.062
Alcohol problems	-0.123	0.013	-9.487***	-0.097–-0.148
Financial stress	-0.154	0.011	-13.90***	-0.132–-0.176

*Note.* Development sample  $n = 14,367$  men and 10,196 women. All estimates are standardized.

\*\*  $p < .01$ . \*\*\*  $p < .001$ .

### *Child Physical and Emotional Assault and Abuse*

Past theoretical and empirical work regarding risk for child abuse has either (a) involved identified abusive families (i.e., those who have been caught) or (b) conceptualized abuse as assault — that is, aggressive acts that may or may not have caused actual injury. Our analyses were designed to further this work by delineating connections between (a) both known and novel individual-, family-, and community-level risk and promotive factors and (b) child physical assault and abuse in a non-identified<sup>5</sup> community sample.

To that end, the following four-step model building approach was utilized with the development sample: (a) previous theoretical and empirical models were reviewed (e.g., Slep & O’Leary, 2007), (b) correlation matrices of study variables were examined, and (c) backward elimination regression analyses were conducted to determine which study variables predict the most variance (and are most likely relatively proximal predictors) of child assault and abuse (see above). Based on these steps, an initial model was tested in the development sample using structural equation modeling. The model was further refined by examination of fit indices, standardized regression coefficients, and modification indices.

Approximately 54% of the sample reported having engaged in at least one form of physical assault against a child during the past year; the past-year prevalence of CS-CPA was 8%. Almost 19% of participants reported at least one qualifying act of emotional assault against a child, and 4.5% of the total sample reported CS-CEA perpetration. Nearly all of the study variables demonstrated significant bivariate associations with mothers’ and fathers’ reports of child physical and emotional assault and abuse. Examination of the intercorrelations among predictors (see Table 30) indicated that some variables were more closely associated than others and might be better represented by latent factors. A measurement model was constructed representing the following proposed latent factors: individual functioning (depressive symptoms, personal coping, physical well being), maturity (age, family income, length of marriage), and community support (community unity, support from formal agencies, support from leadership, social support, and support for youth). A confirmatory factor analysis was then performed using this model, separately by gender. The measurement model resulted in an excellent fit for both mothers,  $\chi^2(41) = 570.814$ , CFI = .97, TLI=.96, and RMSEA = .04, and fathers,  $\chi^2(41) = 437.248$ , CFI = .98, TLI=.98, and RMSEA = .03, confirming the presence of the hypothesized latent factors, which were then utilized as such in further modeling. All other variables were retained as separate measured variables.

Based on the extant literature and our own multiple regression work (see above), we hypothesized (a) that community support would operate through individual functioning and family variables, (b) that individual functioning, parent-child relationship satisfaction, and maturity would be proximal predictors of parent-child emotional and physical assault, and (c) that low parent-child relationship satisfaction and high levels of assault would predict clinically significant child abuse. Drawing from these analyses and hypotheses, preliminary models were constructed. Variables that had stronger associations with one another were organized to take their intercorrelations into account. These initial structural equation models were then tested, nonsignificant paths were removed, and modification indices were examined to find paths that were not hypothesized but, if added, would substantially improve model fit.

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<sup>5</sup>Nearly all AD members in the current sample who self-reported having committed child physical or emotional abuse in the past year also reported that no one in the AF community was aware that they were even having parent-child conflicts (see Snarr, et al., 2006).



The final models for mothers and fathers (see Figure 10) were identical, with the exception of a path from community support to alcohol problems that was significant for mothers but almost nonexistent for fathers. When tested with the development sample, the final models provided a good fit to the data for mothers,  $\chi^2(219) = 1684.46$ , CFI = .92, TLI=.90, RMSEA = .03, and a good fit for fathers,  $\chi^2(220) = 1863.00$ , CFI = .95, TLI=.93, RMSEA = .03. The final models were then tested in the validation sample, as described above, using multi-group analyses. The unconstrained configural models, in which all estimated parameters were free to vary across groups, provided a good fit to the data for mothers,  $\chi^2(446) = 3227.43$ , CFI = .93, TLI=.91, RMSEA = .03, and for fathers,  $\chi^2(448) = 3762.71$ , CFI = .95, TLI=.93, RMSEA = .03. This indicated that the basic structure of the model was valid in both groups for both genders. When these unconstrained models were compared to their respective strict invariance models (with all possible parameters constrained to be equal across samples), differences in model fit were not significant for mothers,  $\Delta\chi^2(100) = 96.36$ ,  $p = .58$ , or fathers,  $\Delta\chi^2(99) = 93.96$ ,  $p = .62$ . This indicated that the equality constraints imposed did not significantly worsen the model for either gender; therefore, the model, despite its complexity, completely cross-validated in the holdout sample for both mothers and fathers.

The last analysis step was to compare the final models for mothers and fathers. Because the final model for fathers was completely subsumed by the model for mothers, the final model for mothers was used to compare genders. For these analyses, the development and validation samples were combined. The unconstrained configural models, in which all estimated parameters were free to vary across groups, provided a good fit to the data,  $\chi^2(438) = 6752.01$ , CFI = .94, TLI=.92, RMSEA = .03. However, even a partially constrained model, in which only the factor loadings and path coefficients were constrained to be equal across genders, significantly worsened the fit,  $\Delta\chi^2(53) = 406.173$ ,  $p < .001$ . The data were explored in order to examine whether it was only a few paths that were causing the significant difference. This was not the case; it was necessary to release a total of 23 paths (i.e., the 23 paths with the largest differences between the unstandardized coefficients found in the two groups) before the partially constrained model was no longer significantly worse than the unconstrained model. This indicated that although the basic model structure was the same for mothers and fathers, the relative contributions of various variables to the model differed by gender.

As can be seen in Figure 10, the final model was quite complex. Specific findings were as follows:

- Four pairs of measured-variable residuals were allowed to correlate: (a) length of marriage with age, (b) family coping ability with personal coping ability, (c) depressive symptoms with physical well being, and (d) child physical abuse with child emotional abuse.
- Greater parental maturity was associated with (a) higher levels of community support, (b) greater religious involvement, (c) having more children present in the home, and (d) less financial stress; there was also a direct, negative path from parental maturity to child physical assault, indicating that less mature parents reported engaging in a greater variety of aggressive acts toward their children.
- Higher levels of community support were predictive of higher functioning at the level of the community (i.e., a greater sense of safety in the community and greater community resources), the family (i.e., higher relationship satisfaction and better family coping ability), and the individual (see path from community support to individual functioning).

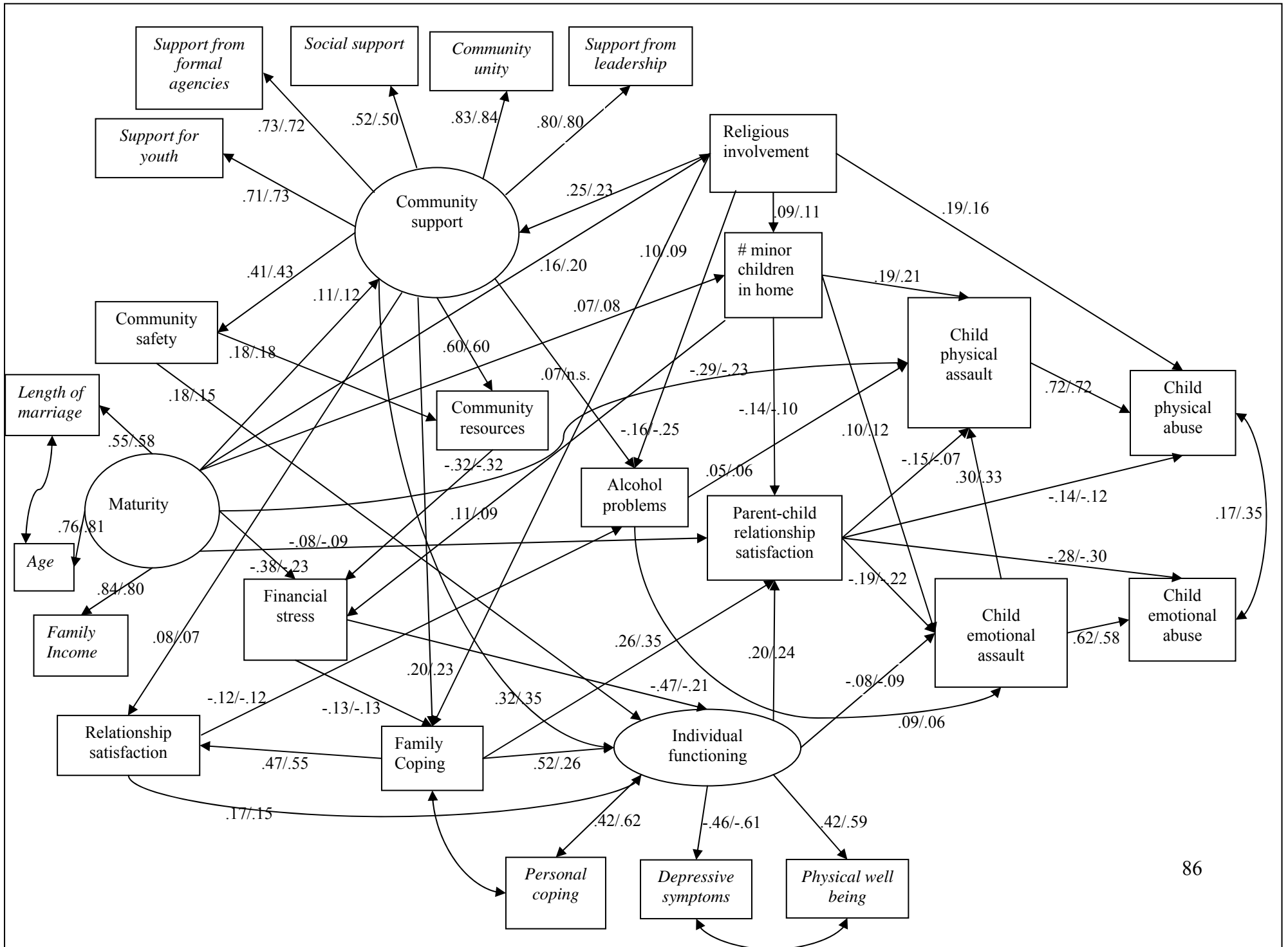
Interestingly and unexpectedly, a greater sense of community support was also associated with higher scores on the alcohol measure — though this was only true for women. As hypothesized, there were no direct paths from community support (or any other community-level variable) to child assault or abuse.

- A greater sense of community safety was associated with both (a) better individual functioning and (b) greater satisfaction with available community resources.
- Greater satisfaction with available community resources, in turn, predicted less financial stress.
- Financial stress was associated with decreased family coping ability and poorer individual functioning.
- Family coping ability was directly associated with both parent-child relationship satisfaction and individual functioning; it also predicted individual functioning indirectly via its effects on relationship satisfaction. Neither relationship satisfaction nor family coping directly predicted child maltreatment.
- Religious involvement, on the other hand did so. Besides being positively associated with community support, family coping, and number of children — and negatively associated with alcohol problems — there was a direct, positive connection between religious involvement and child physical abuse. Other than parent-child relationship satisfaction, religious involvement was the only non-assault variable with a direct path to either of the abuse variables. Furthermore, the association cannot be due to a greater propensity for the highly religious in the sample to use a greater variety of physical discipline techniques, as there was no direct path to physical assault; rather, higher religious involvement was associated with a greater likelihood for child injury to occur as a consequence of physical discipline.
- Having more children in the home was associated with greater financial stress, lower parent-child relationship satisfaction, and higher levels of child physical and emotional assault.
- Alcohol problems were likewise predictive of higher levels of child physical and emotional assault; these associations were entirely direct, as there was no path from alcohol problems to parent-child relationship satisfaction or individual functioning.
- Individual functioning impacted child maltreatment primarily via effects on parent-child relationship satisfaction, though there was a direct path from individual functioning to child emotional assault.
- As expected, higher parent-child relationship satisfaction directly predicted all four forms of child maltreatment.
- Child emotional assault predicted child physical assault, and each form of assault was strongly associated with its respective form of abuse.
- Finally, even after controlling for all other variables in the model, there was still a residual correlation between child physical and child emotional abuse — particularly among fathers in the sample.

Table 30  
Correlations among Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1. PHYAGG	–	.42	.32	.14	.09	-.25	.17	-.14	-.13	-.01	-.17	-.21	.21	-.24	-.10	-.06	-.15	.12	-.03	-.02	-.06	-.05	-.01	-.01
2. PHYABUSE	.43	–	.25	.18	.01	-.04	.09	-.06	-.08	.08	-.08	-.02	.16	-.15	-.05	-.02	-.06	.06	.02	-.02	-.01	-.01	.01	-.02
3. EMOAGG	.34	.27	–	.55	.08	.01	.19	-.17	-.13	-.02	-.17	.03	.13	-.26	-.10	-.06	-.02	.10	-.04	-.05	-.05	-.05	-.01	-.04
4. EMOABUSE	.16	.16	.51	–	.04	.07	.11	-.12	-.07	-.01	-.09	.08	.05	-.15	-.08	-.01	.02	.06	-.01	-.04	-.01	-.02	-.02	-.01
5. AUDIT	.08	.00	.06	.04	–	.00	.10	.00	-.01	-.17	-.10	-.03	-.06	-.11	-.11	.03	.09	.00	.01	.04	.00	.01	.04	.02
6. AGE	-.18	-.02	.01	.06	-.11	–	-.13	.07	.09	.16	.03	.70	.08	-.05	.00	.08	.52	-.24	.10	.06	.07	.03	.09	-.01
7. DEPSX	.10	.07	.13	.10	.11	-.07	–	-.41	-.53	-.13	-.31	-.12	-.02	-.26	-.31	-.25	-.14	.29	-.23	-.19	-.25	-.19	-.20	-.19
8. PERCOPE	-.07	-.06	-.10	-.08	-.06	.09	-.40	–	.35	.09	.44	.02	-.03	.31	.27	.27	.15	-.24	.24	.22	.27	.26	.23	.21
9. PHYWB	-.06	-.04	-.11	-.08	-.07	-.01	-.52	.38	–	.14	.29	.10	.03	.24	.23	.21	.10	-.26	.21	.20	.22	.16	.18	.19
10. RELINV	-.01	.05	-.05	-.02	-.23	.16	-.12	.11	.17	–	.15	.14	.13	.06	.12	.16	.08	-.07	.19	.10	.19	.16	.19	.15
11. FAMCOPE	-.12	-.07	-.18	-.13	-.10	-.01	-.28	.43	.28	.14	–	.01	-.04	.39	.51	.20	.04	-.20	.15	.19	.22	.20	.18	.19
12. MARLENG	-.16	-.03	.01	.07	-.12	.62	-.07	.08	.01	.16	.02	–	.12	-.01	.00	.05	.36	-.16	.06	.04	.06	-.01	.09	-.04
13. NUMKIDS	.20	.16	.13	.07	-.08	.09	-.05	.01	.01	.13	-.01	.13	–	-.14	.01	-.02	.03	.06	.01	.00	-.01	-.03	.02	-.02
14. PCREL	-.16	-.11	-.24	-.15	-.07	-.03	-.24	.31	.23	.08	.44	.02	-.10	–	.21	.13	.00	-.13	.11	.16	.13	.13	.12	.14
15. RELSAT	-.10	-.07	-.13	-.09	-.10	.01	-.27	.30	.23	.14	.55	.04	.02	.28	–	.17	-.02	-.19	.14	.14	.18	.16	.15	.14
16. SUPLEAD	-.06	-.03	-.07	-.04	-.08	.10	-.29	.29	.31	.20	.22	.08	.01	.16	.17	–	.12	-.24	.50	.27	.74	.63	.34	.54
17. FAMINC	-.11	-.01	.01	.05	-.02	.67	-.11	.12	.06	.15	.02	.43	.04	-.02	.03	.09	–	-.32	.11	.09	.09	.06	.12	.07
18. FSTRESS	.09	.05	.08	.05	.07	-.22	.27	-.24	-.25	-.06	-.20	-.13	.05	-.18	-.19	-.22	-.27	–	-.27	-.21	-.23	-.20	-.20	-.20
19. COMRES	-.03	.00	-.04	-.01	-.07	.16	-.24	.22	.27	.19	.17	.11	.05	.13	.15	.49	.15	-.29	–	.41	.54	.50	.33	.58
20. COMSAF	-.01	.00	-.04	-.04	-.03	.05	-.21	.24	.23	.09	.20	.03	.00	.18	.15	.30	.08	-.23	.41	–	.30	.29	.26	.32
21. COMUNIT	-.04	-.02	-.08	-.05	-.09	.09	-.29	.30	.30	.23	.25	.08	.04	.17	.20	.73	.08	-.22	.53	.35	–	.61	.38	.61
22. SUPFORM	-.01	.01	-.05	-.02	-.07	.08	-.23	.25	.25	.18	.19	.06	.02	.15	.14	.62	.05	-.18	.49	.30	.62	–	.35	.54
23. SOCSUP	.03	.02	.00	-.01	.01	.06	-.18	.24	.19	.15	.20	.05	.04	.16	.17	.35	.08	-.20	.31	.28	.37	.37	–	.29
24. SUPYOUT	-.01	.00	-.06	-.04	-.07	.06	-.25	.24	.26	.18	.21	.05	.03	.18	.16	.57	.09	-.20	.56	.33	.62	.53	.29	–

*Note.* Mothers are above the diagonal and fathers are below. Computed using parents in development subsample only. Weighted  $N = 10,897$  mothers and 9,232 fathers. All correlations are significant at  $p < .001$  for  $|r| \geq .04$ . PHYAGG = Child physical assault, PHYABUSE = Child physical abuse, EMOAGG = Child emotional assault, EMOABUSE = Child emotional abuse, AUDIT = Alcohol problems, AGE = Participant age, DEPSX = Depressive symptoms, PERCOPE = Personal coping, PHYWB = Physical well-being, RELINV = Religious involvement, FAMCOPE = Family coping, MARLENG = Marriage length, NUMKIDS = Number of children, PCREL = Parent-child relationship satisfaction, RELSAT = Relationship satisfaction, SUPLEAD = Support from leadership, FAMINC = Family income, FSTRESS = Financial stress, COMRES = Community resources, COMSAF = Community safety, COMUNIT = Community unity, SUPFORM = Formal agency support, SOCSUP = Social support, SUPYOUT = Support for youth.



*Figure 10.* Final cross-validated model predicting child physical and emotional assault and aggression from individual-, family-, and community-level variables. Italicized text indicates a measured variable that was utilized as an indicator of a latent construct. Two-headed arrows indicate correlated residuals. Standardized coefficients constrained across the development and validation samples are presented; mothers' coefficients are to the left of the slash, fathers' coefficients to the right. All paths were significant at  $p < .001$ .

## KEY RESEARCH ACCOMPLISHMENTS

- The prevalences of individual secretive problems (i.e., substance abuse and suicidality), as well as most family problems (e.g., physical and emotional abuse), can be accurately estimated without asking directly whether AD members have these problems.
- Even controlling for individual factors (e.g., depressive symptoms) and family factors (e.g., family income, number of children), men's workplace factors (i.e., satisfaction with the AF way of life, workgroup cohesion) and women's community factors (i.e., community unity) uniquely predicted hazardous alcohol consumption.
- Even controlling for depressive symptoms, variables from all four ecological levels uniquely predicted suicidal ideation.
- Depressive symptoms did not significantly predict suicide attempts among those with suicidal thoughts; other variables, however, did (e.g., high alcohol problems and low social support for suicidal men, partner physical assault victimization for women).
- Workplace- and community-level variables predicted men's partner physical assault and abuse perpetration; women's perpetration was more exclusively linked to individual- and family-level factors.
- Workplace- and community-level risk and promotive factors — though not previously studied in the context of partner emotional abuse — are important and relate to partner emotional abuse victimization largely via effects on individual- and family-level functioning.
- Religious involvement is a robust, direct risk factor for child physical abuse, though it remains unclear whether this is true for all religious affiliations.
- Unique risk and promotive factors for child emotional abuse are all individual- and family-level variables and are similar for both mothers and fathers.
- The association between alcohol and partner physical assault was weakened by maturation/development, improved community safety, and better relationship functioning.
- Physical well being and years in the military boosted the ability of increased relationship satisfaction in decreasing men's suicidal ideation; financial stress, alcohol problems, and partner physical assault victimization reduced said promotive effect.
- High levels of depressive symptoms (a) were associated with higher child physical assault scores and (b) tended to negate the aggression-reducing effects of workplace and community support.

- Relatively mature fathers tended to have lower child physical assault scores; however, those who did engage in a greater variety of aggressive acts against their children were more likely than less mature fathers to injure the victim(s).
- Relationship satisfaction and family coping significantly moderated — “boosted” — the association between parent-child relationship satisfaction and child emotional abuse.
- Depressive symptoms, perceived financial stress, and satisfaction with the Air Force were identified as significant mediators of the link between community functioning and hazardous drinking for men and women. Relationship satisfaction was also identified as a mediator for men.
- Risk and promotive factors from all four levels were associated with both minor partner assault and injurious partner physical abuse, with relatively distal community and workplace factors operating via more proximal individual- and family-level variables (e.g., relationship satisfaction).
- A substantial portion of the relations that individual- and community-level risk factors (i.e., substance abuse, financial stress, low community resources, poor community safety) have to physical and mental health is due to their associations with relationship functioning,
- The associations between (a) risk and promotive factors from all four ecological levels and (b) child assault and abuse are quite complex; as with partner assault and abuse, community factors operate on child assault and abuse via impacts on family and individual functioning.

## REPORTABLE OUTCOMES

- Foran, H. M., Heyman, R. E., Slep, A. M. S., & USAF Family Advocacy Program. (in press). Hazardous drinking and military community functioning: Identifying mediating risk factors. *Journal of Consulting and Clinical Psychology*.
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Further results are currently being prepared for publication.

## OVERALL SUMMARY

### Estimating Rates of Secretive Problem *Without Directly Asking About Them*

AF stakeholders have a significant interest in determining the degree to which problems such as substance abuse, suicidality, and family maltreatment are present in AF communities. Such “secretive problems” (an accurate label because people often conceal these behaviors) cause a great deal of pain and suffering in AF communities and ultimately compromise combat readiness. Directly asking about secretive problems, even if anonymous fashion such as the biannual Community Assessments, requires respondents to endure a long list of highly sensitive questions that many would rather not answer (e.g., “Have you ever choked your child?”). The subjective discomfort experienced by many respondents in answering such questions may hurt survey response and completion rates, compromising the integrity of data collection efforts. Thus, it would be of great practical benefit to have a less invasive way of estimating the rates of secretive problems in the AF. In other words, can one estimate the prevalence of secretive problems without directly asking about them? We took on this question with vigor and found that the answer is a qualified “yes” Using respondents’ answers to relatively innocuous questions (e.g., regarding family characteristics, perceptions of the AF community, financial wellbeing, etc.) we were able to quite accurately predict the prevalences of individual secretive problems and most family problems as well. Notwithstanding these successes, the equations we developed underpredicted the rates of physical child abuse and male-to-female partner emotional abuse. Future research will need to determine whether accurate estimation of these prevalences is possible with data only from parents (in the case of child physical abuse) and victims (in the case of partner emotional abuse) We used rigorous, conservative statistical analyses to arrive at equations that can be used to predict secretive problem rates in the future. This would give the AF the option of not directly asking about secretive problems in future Community Assessments.



## Combating Secretive Problems Indirectly: An Ecological Risk and Protective Factor Approach

Given the secretive nature of these problems, only about 1 in 6 if those (a) committing substantiatable acts of family maltreatment, (b) drinking at problematic levels, or (c) considering suicide come to the attention of AF members (Snarr et al., 2006). Hence, proactive measures to address secretive problems (e.g., outreach, prevention) are critical. Waiting to intervene until secretive problems attract attention is costly and is unlikely to reduce the prevalence of these problems. The most effective treatment interventions for these problems have limited success, and by the time individuals or families are involved in the system, many human and financial costs have already been incurred. Finally, because treatment necessarily follows both (a) developing the problem and (b) presenting for treatment (either voluntarily or command-directed, which only a small proportion of those with the problems do), treatment is not a viable strategy for reducing the scope of the problems. Successful prevention involves risk and protective factors for secretive problems, which must be addressed and targeted. A great deal of knowledge regarding risk and protective factors exists in the research literature; however, until the current project was conducted, several gaps existed. First, a great deal of research has focused on understanding risk imparted by unchangeable or static risk factors. This research is useful in developing theories of etiology, but is less directly relevant to informing prevention. (For example, it is impossible to develop an intervention to remove the risk imparted through witnessing spouse abuse as a child or being the offspring of a long line of alcohol-dependent men.) In contrast, the current project investigated *changeable* risk factors that can readily be targeted by prevention programs. Second, most studies either adopt a clinical threshold for the secretive problem, *or* they use a representative sample. The current project, on the other hand, employed a generalizable sample (which has the most direct implications for prevention) AND used clinically-specific definitions of the problems. Third, most research has focused on individual risk factors, with most other ecological levels of influence receiving very little research attention. This has been especially unfortunate from the perspective of those attempting to develop more effective prevention approaches because so little guidance is available about risk operating at the more macro levels of influence that policymakers often have the ability to impact (e.g., workplace, community). The current project broke this constricting pattern by investigating a rich variety of potential individual-, family-, workplace-, and community-level factors. Fourth, with very few exceptions, past literature has been based on civilian samples, whereas the current project included important military-specific variables (e.g., time spent deployed, unit cohesion). Fifth, although risk for secretive problems has received an increasing amount of attention in the literature, almost nothing has been known about protective or interactive effects, which were a primary focus of the current project. Finally, our project is the first to explicate the complex multivariate connections between risk and protective factors operating at different ecological levels of influence. By addressing these gaps, this project provides the AF's state-of-the-art prevention infrastructure with the information necessary to design and implement effective community health interventions to prevent secretive problems.

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